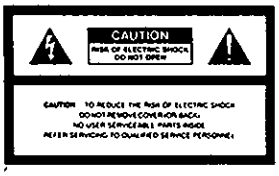
Roland

MIDI MULTI TIMBRAL SOUND MODULE

# D-110

OWNER'S MANUAL


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK
DO NOT REMOVE COVER (OR BACK).
NO USER SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

INSTRUCTIONS PERTAINING TO A RISK OF FIRE, ELECTRIC SHOCK OR INJURY TO PERSONS.

# IMPORTANT SAFETY INSTRUCTIONS

WARNING When using electric products, basic precautions should always be followed, including the following;

1. Read all the instructions before using the product.
2. To reduce the risk of injury, close supervision is necessary when a product is used near children.
3. Do not use this product near water- for example, near a bathtub, washbowl, kitchen sink, in a wet basement, or near a swimming pool, or the like.
4. This product should be used only with a cart or stand that is recommended by the manufacture.
5. This product, either alone or in combination with an amplifier and headphones or speakers, may be capable of producing sound levels that could cause permanent hearing loss.
   Do not operate for a long period of time at a high volume level or at level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.
6. The product should be located so that its location or position does not interfere with its proper ventilation.
7. The product should be located away from heat sources such as radiators, heat registers or other products that produce heat.
8. The product should avoid using in where it may be effected by dust.
9. The product should be connected to a power supply only of the type described in the operating instructions or as marked on the product.
10. The power-supply cord of the product should be unplugged from the outlet when left unused for a long period of time.
11. Do not tread on the power-supply cord.
12. Do not pull the cord but hold the plug when unplugging.
13. When setting up with any other instruments, the procedure should be followed in accordance with instruction manual.
14. Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
15. The product should be serviced by qualified service personnel when:
    - A: The power-supply cord or the plug has been damaged; or
    - B: Objects have fallen, or liquid has been spilled into the product; or
    - C: The product has been exposed to rain; or
    - D: The product does not appear to operate normally or exhibits a marked change in performance: or
    - E: The product has been dropped, or the enclosure damaged.
16. Do not attempt to service the product beyond that described in the user-maintenance instructions. All other servicing should be referred to qualified service personnel.

# SAVE THESE INSTRUCTIONS

**ADVARSEL!**

Lithiumbatteri. Eksplosionsfare.
Udskiftning må kun foretages af en sagkyndig, og som beskrevet i servicemanual.

**VARNING!**

Lithiumbatteri. Explosionsrisk.
Får endast bytas av behörig servicetekniker.
Se instruktioner i servicemanualen.

**ADVARSEL!**

Lithiumbatteri. Fare for eksplotion.
Må bare skiftes av kvalifisert tekniker som beskrevet i servicemanualen.

**VAROITUS!**

Lithiumparisto. Räjähdysvaara.
Pariston saa vaihtaa ainoastaan alan ammottimies.

## WARNING

THIS APPARATUS MUST BE EARTH GROUNDED.

The three conductors of the mains lead attached to this apparatus are identified with color as shown in the table below, together with the matching terminal on the UK type power plug. When connecting the mains lead to a plug, be sure to connect each conductor to the correct terminal, as indicated.
**"This instruction applies to the product for United Kingdom."**

| MAINS LEADS | | PLUG |
|---|---|---|
| Conductor | Color | Mark on the matching terminal |
| Live | Brown | Red or letter L |
| Neutral | Blue | Black or letter N |
| Grounding | Green-Yellow | Green, Green-Yellow, letter E or symbol |

**Bescheinigung des Herstellers /Importeurs**

Hiermit wird bescheinigt, daß der/die/das
ROLAND MULTI TIMBRAL SOUND MODULE D-110
(Gerat, Typ Bezeichnung)

in Übereinstimmung mit den Bestimmungen der
Amtsbl. Vfg 1046 / 1984
(Amtsblattverfugung)

funk-entstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerates angezeigt und die Berechtigung zur Überprufung der Serie auf Einhaltung der Bestimmungen eingeraumt.

Roland Corporation Osaka / Japan
Name des Herstellers/Importeurs

**RADIO AND TELEVISION INTERFERENCE**

"Warning – This equipment has been verified to comply with the limits for a Class B computing device, pursuant to Subpart J, of Part 15, of FCC rules. Operation with non-certified or non-verified equipment is likely to result in interference to radio and TV reception."

The equipment described in this manual generates and uses radio-frequency energy. If it is not installed and used properly, that is, in strict accordance with our instructions, it may cause interference with radio and television reception.

This equipment has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J, of Part 15, of FCC Rules. These rules are designed to provide reasonable protection against such a interference in a residential installation. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by the following measure:

- Disconnect other devices and their input-output cables one at a time. If the interference stops, it is caused by either the other device or its I/O cable.

These devices usually require Roland designated shielded I-O cables. For Roland devices, you can obtain the proper shielded cable from your dealer. For non Roland devices, contact the manufacturer or dealer for assistance.

If your equipment does cause interference to radio or television reception, you can try to correct the interference by using one or more of the following measures:

- Turn the TV or radio antenna until the interferences stops.
- Move the equipment to one-side or the other of the TV or radio.
- Move the equipment farther away from the TV or radio.
- Plug the equipment into an outlet that is on a different circuit than the TV or radio. (That is, make certain the equipment and the radio or television set are on circuits controlled by different circuit breakers or fuses.)
- Consider installing a rooftop television antenna with coaxial cable lead-in between the antenna and TV.

If necessary, you should consult your dealer or an experienced radio-television technician for additional suggestions. You may find helpful the following booklet prepared by the Federal Communications Commission:

"How to Identify and Resolve Radio-TV Interference Problems."

This booklet is available from the U.S. Government Printing Office, Washington, D.C., 20402. Stock No. 004-000-00345-4

Please read the separate volume "MIDI", before reading this owner's manual.

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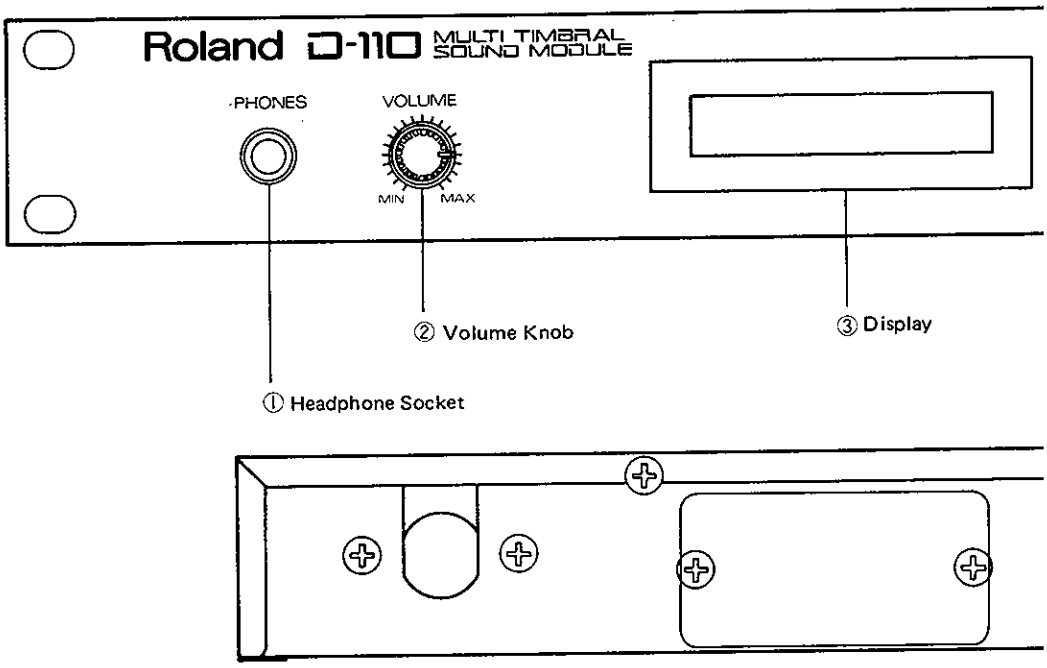
MULTI TIMBRAL
SOUND MODULE

# D-110

# OWNER'S MANUAL

# ■PANEL DESCRIPTON




**① Headphone Socket**
Connect stereo headphones to this socket. The best possible headphones to be used should have an impedance from 8 to 150 ohms. Even when headphones are connected to this socket, the Output Socket still sends signals.

**② Volume Knob**
This controls the volume of the sound sent from the Output Socket and Headphone Socket.

**③ Display**
This shows the current condition of the D-110.

**④ Exit Button**
Use this button to return to the Play mode from another mode.

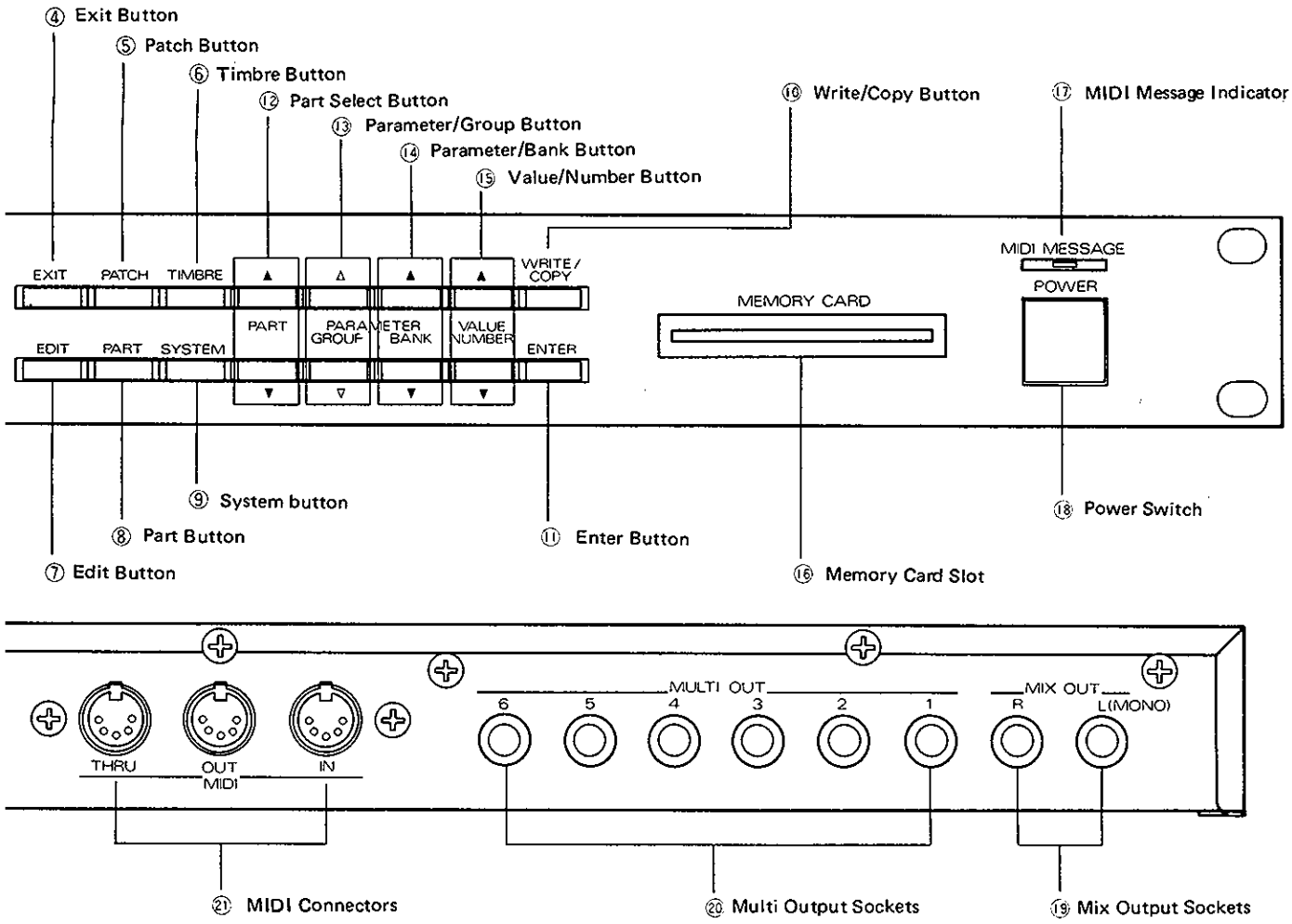
**⑤ Patch Button** See page 40.
Push this button to enter Patch selecting mode.

**⑥ Timbre Button** See page 42.
Push this button to enter Timbre selecting mode.

**⑦ Edit Button** See pages 40, 42 and 48
Push this button to enter editing mode for a Patch, Timbre or Tone, or Rhythm Setup mode.

**⑧ Part Button** See pages 34 and 68
Push this button to enter value setting mode for the Output Level of each Part, etc.

**⑨ System Button** See page 80.
Push this button to enter value setting mode for the Master Tuning, etc.







**⑩ Write/Copy Button** See pages 71 and 83.

**⑪ Enter Button** See page 84.
Push this button to execute a specific procedure.

**⑫ Part Select Buttons** See page 68.
Use these buttons for selecting a Part or Partial.

**⑬ Parameter/Group Buttons**
Use these buttons to select a Parameter or Tone Group.

**⑭ Parameter/Bank Buttons**
Use these buttons to select a Parameter or Tone Bank, or to change values drastically.

**⑮ Value/Number Buttons**
Use these buttons to change values or select Tone Number.

**⑯ Memory Card Slot**
Insert a memory card here.

**⑰ MODI Message Indicator**
This is lit while MIDI messages are being received.

**⑱ Power switch**
This turns the unit on or off.

**⑲ Mix Output Sockets**
These are stereo output sockets.

**⑳ Multi Output Sockets**
These are independent output sockets.

**㉑ MIDI Connectors**
These sockets are used for connection MIDI devices.

# ■ IMPORTANT NOTES

## POWER

- The appropriate power supply for this unit is shown on its name plate. Please make sure that the line voltage in your country meets the requirement.

- Do not use the same socket used for any noise generating device (such as a motor or variable lighting system) or large power consuming device.

- When connecting a power cable to the socket, be sure that the unit is turned off.

- When disconnecting the power plug from the socket, do not pull the cord but hold the plug to avoid damaging the cord.

- Handle the power cord gently.

- If the unit is not to be used for a long period of time, unplug the power cord from the socket.

- It is normal for this unit to become hot while being operated.

- Before setting up this unit with other devices, turn this unit and all the other units off.

- This unit might not work properly if turned on immediately after being turned off. If this happens, simply turn it off and turn it on again after waiting a few seconds.

## LOCATION

- Do not place this unit in the following conditions:

  In extreme heat (where it may be affected by direct sunlight, near a heater, etc.)
  In extreme humidity where it may be affected by dust or vibration.

- Operating this device near a neon, fluorescent lamp, TV or CRT display may cause noise interference. If so, change the angle or the position of the device.

- If you operate this unit near a TV or radio which is turned on, noise or picture trouble may occur. If this happens, move the unit away from it.

- Do not place anything heavy on this unit or the power cord.

## CLEANING

- Use a mild detergent for cleaning. Do not use solvents such as thinner.

## MEMORY BACKUP

- This device features a memory back-up system that retains the data even when switched off. The battery that supports the back-up circuit should be replaced every five years. Call Roland for battery replacement. (The first replacement may be required.)

- To avoid accidental erasure or loss of data, please make a data memo or save data onto a memory card. If it happens to be erased while the device is being repaired, there is no way to restore the data.

- When the battery is low, the Display defaults as shown below, and the data in memory may be lost.

# ■CONTENTS


PANEL DESCRIPTION . . . . . 4
IMPORTANT NOTES . . . . . 6

## BASIC COURSE

1 OUTLINE OF THE D-110 . . . . . 10
1. Features . . . . . 10
2. 8 Modes of the D-110 . . . . . 11
3. Basic Concept of the D-110 . . . . . 12
4. Partials and the Maximum Voices . . . . . 14
2 CONNECTIONS . . . . . 15
3 PLAYING THE D-110 . . . . . 16
1. Power up . . . . . 16
2. MIDI Channel Setting . . . . . 16
3. Timbre Selection
(Changing the sound in each Part) . . . . . 18
4. Memory Card . . . . . 20
5. Rhythm Part Play . . . . . 22
6. Master Tuning . . . . . 23
7. Level Adjustment . . . . . 23
8. Pan Setting . . . . . 24
9. Reverb Setting . . . . . 25
4 PATCHES . . . . . 27
1. Patch Writing . . . . . 28
2. Patch Selection . . . . . 29

## ADVANCED COURSE

1 BASIC PROCEDURES . . . . . 34
1. Basic Procedure for Editing Parameters . . . . . 34
2. Memory . . . . . 36
2 PATCH EDITING . . . . . 40
1. Editing Procedure . . . . . 40
2. Patch Parameters . . . . . 41
3 TIMBRE EDITING . . . . . 42
1. Timbre Editing Procedure . . . . . 42
2. Timbre Parameters . . . . . 43
4 TONE EDITING . . . . . 45
1. The Basic Concept of a Tone . . . . . 45
2. Editing Procedure . . . . . 48
3. Copying a Tone or Partial . . . . . 51
4. Tone Parameters . . . . . 53
5 PART SETTING . . . . . 68
1. Editing Procedure . . . . . 68
2. Part Parameters . . . . . 69
6 WRITING . . . . . 71
1. Patch Writing . . . . . 71
2. Timbre Writing . . . . . 73
3. Tone Writing . . . . . 75
7 PHYTHM SETUP . . . . . 77
1. Editing Procedure . . . . . 77
2. Phythm Setup Parameters . . . . . 78
8 SYSTEM SETUP . . . . . 80
1. Editing Procedure . . . . . 80
2. System Setup Parameters . . . . . 80
9 DATA TRANSFER . . . . . 83
1. Data Transfer Mode . . . . . 83
2. Data Transfer Using a Memory Card . . . . . 84
3. Data Transfer with MIDI (BULK) . . . . . 86
4. Data Transfer via MIDI (INDIVIDUAL) . . . . . 87
10 ROM PALY . . . . . 88

## REFERENCE

1 LA SYNTHESIS . . . . . 90
1. What is sound made of? . . . . . 90
2. Key Point for Sound Creation . . . . . 91
2 TROUBLE-SHOOTING . . . . . 95
1. Before Calling for Service . . . . . 95
2. Error Messages . . . . . 96
3 APPENDIX TABLES . . . . . 98
1. Parameter Table . . . . . 98
2. Preset Tones Table . . . . . 101
3. Initial Rhythm Setting . . . . . 102
4. PCM Sounds Table . . . . . 103
5. Blank Chart . . . . . 105
4 GUIDE FOR USING THE D-110 . . . . . 108

MIDI IMPLEMENTATION . . . . . 110
MAIN SPECIFICATION . . . . . 121
INDEX . . . . . 122

# BASIC COURSE


1 OUTLINE OF THE D-110
2 CONNECTIONS
3 PLAYING THE-110
4 PATCHES

# 1 OUTLINE OF THE D-110

The Roland D-110, a Multi Timbral Sound Module can be used as the sound source of a keyboard, sequencer, etc.

## 1. Features

- **LA Synthesis**

  LA stands for Linear Arithmetic synthesis which is the heart of the new technology. LA synthesis involves a great many technological advances resulting not only in a superior sound quality but also an improved ease of programming, which has been proved in the D-50 or D-550. In this way, Roland has succeeded in maintaining a high degree of familiarity to the user despite the technical wizardry involved.

- **Multi Timbral Function**

  The Multi Timbral function turns the D-110 into eight independent synthesizers, allowing you to enjoy ensemble style performance with only one D-110.

- **Multi Output**

  The D-110 features 6 independent Multi outputs where 6 different sounds can be sent out separately. Consequently, different effects may be applied to the various sounds, improving the quality of the mixing possibilities.

- **Part**

  The D-110 has 8 Parts which work like conventional synthesizers, and a Rhythm Part which behaves like the sounds of a rhythm machine. Each Part can be controlled by information on a different MIDI channel.

- **Tone**

  A Tone is the basic unit of a sound. The D-110's memory capacity can retain 128 different Preset Tones, 64 user-programmed Tones, and 63 Preset Rhythm Tones.

- **Patch and Timbre**

  A Timbre consists of Tones and Performance Controlling functions. The D-110 can store up to 128 Timbres, and any of these Timbres can be assigned to each Part. During live performance, you can use various sounds by changing these Timbres.
  A Patch is a collection of Reverb and Part settings. The D-110 can store up to 64 Patches.

- **Built-in Digital Reverb**

  The digital reverberation section of the D-110 can create reverb effects. You can set a desired reverb and write it into Patch.

- **Rhythm Part**

  The Rhythm Part of the D-110 can use up to 85 Rhythm Tones, Preset Rhythm Tones and the Tones you have programmed yourself. Each Rhythm Tone can have a different Pan and Level setting, as desired.

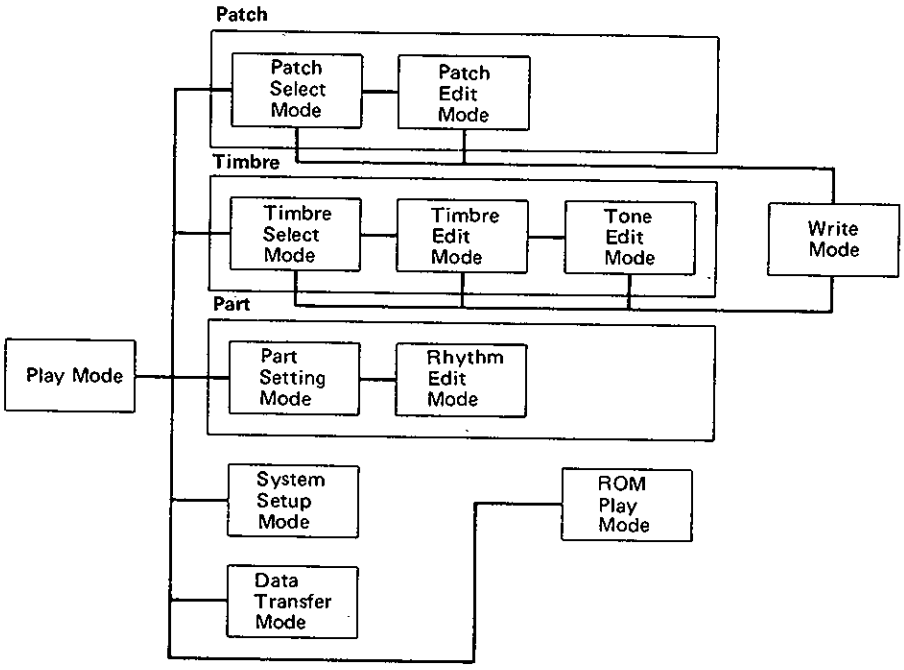
- **Memory Card**

  The optional memory card (M-256D or M-128D) can be used for saving your original sound data for future use.

# 2. 8 Modes of the D-110



Please study the following 8 Modes of the D-110.




**[Play Mode]**

This may be called the normal condition of the D-110. In this mode, you can monitor the Timbre assigned to each Part.

**[Patch Mode]**

The Patch mode involves procedures related to the Patches, such as Reverb settings, etc.

- **Patch Select mode** — Turn to this mode for selecting a patch.
- **Patch Edit mode** — Use this mode for editting a Patch name or Reverb settings.

**[Timbre Mode]**

The Timbre mode allows you to assign a new Timbre to a Part or edit a Timbre or Tone, etc.

- **Timbre Select mode** — This mode allows you to change the Timbre assigned to each Part.
- **Timbre Edit mode** — This mode allows you to edit a Timbre.
- **Tone Edit mode** — This mode allows you to edit a Tone.

[Part Mode] The Part mode deals with the operations related to the 8 Parts and the Rhythm Part.

- **Part Setting mode** In this mode, the volume or MIDI channel of each Part can be selected.
- **Rhythm Setup mode** In this mode, the volume, output or Rhythm Tone assigned to Key number of the Rhythm Part can be selected.

[System Setup Mode] The System Setup mode covers the procedures related to the D-110's overall condition, such as tuning of all the Parts.

[Data Transfer Mode] This mode allows you to transfer data between the D-110 and a memory card, or between the D-110 and another device.

[Write Mode] Select this mode for writing your edited version of a Tone, Timbre or Patch.

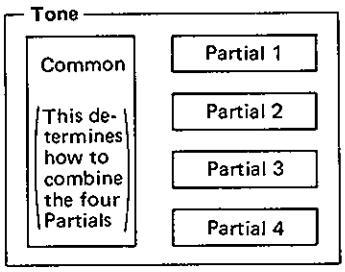
[ROM Play Mode] Turn to this mode to play the preprogrammed performance data which effectively uses the Multi Timbral function.

# 3. Basic Concept of the D-110

The D-110 uses LA synthesis, which stands for Linear Arithmetic synthesis, which is the heart of the new technology. LA synthesis involves a great many technological advances resulting not only in a superior sound quality but also an improved ease of programming. In this way, Roland has succeeded in maintaining a high degree of familiarity to the user despite the technical wizardry involved.
Another feature is the D-110's Multi Timbral function that allows you to enjoy ensemble style performance with only one D-110. In other words, the D-110 has 8 Parts which work like 8 independent synthesizers and a Rhythm Part which behaves like the sounds of a rhythm machine. The following explanation covers the basic knowledge required for the Multi Timbral function.

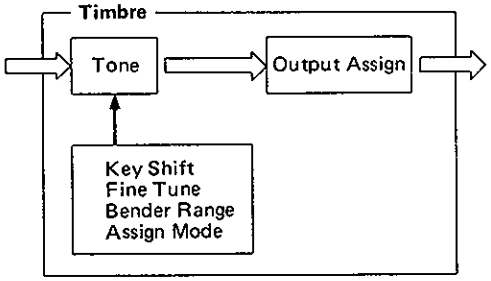
[Partial] A Partial may be called the smallest unit of a sound. A Partial uses either a Synthetizer Sound Generator ( = similar to a conventional analog synthesizer) or a PCM Sound Generator ( = PCM sampling).

[Tone] A Tone consists of a Partial block and a Common block. The Partials are combined in pairs, and two sets of pairs from a Tone. An important Common parameter called "Structure" decides how two of the four Partials should be combined, or which sound generator should be used.




**[Timbre]**

A Timbre consists of Tones and Performance Controlling functions such as bender range and output system. Normally, in this manual, "sound" refers to Timbre.

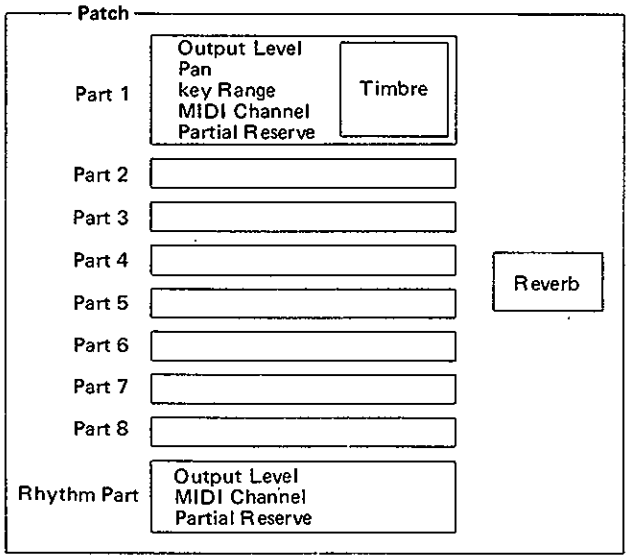



**[Part]**

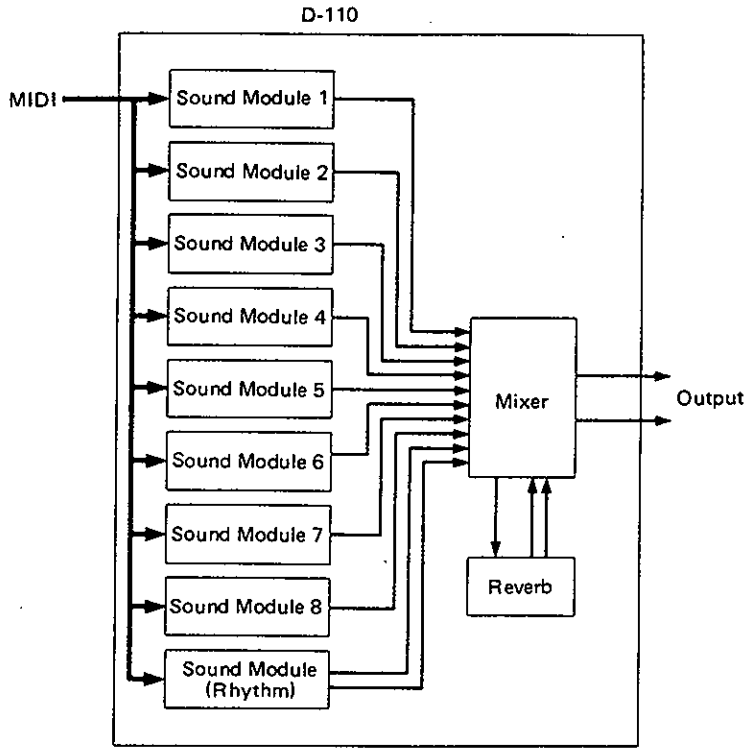
The D-110 has 8 Parts which work like conventional synthesizer modules and a Rhythm Part which behaves like a rhythm module. The volume, MIDI channel and Pan of each Part can be set individually, and more, the volume and output of the Rhythm Part can be set to the desired values.

**[Patch]**

A Patch is a collection of Reverb and Part (Timbre assignment) settings which are related to the overall control of the D-110.



The D-110, therefore, may be considered to be structured as shown below.



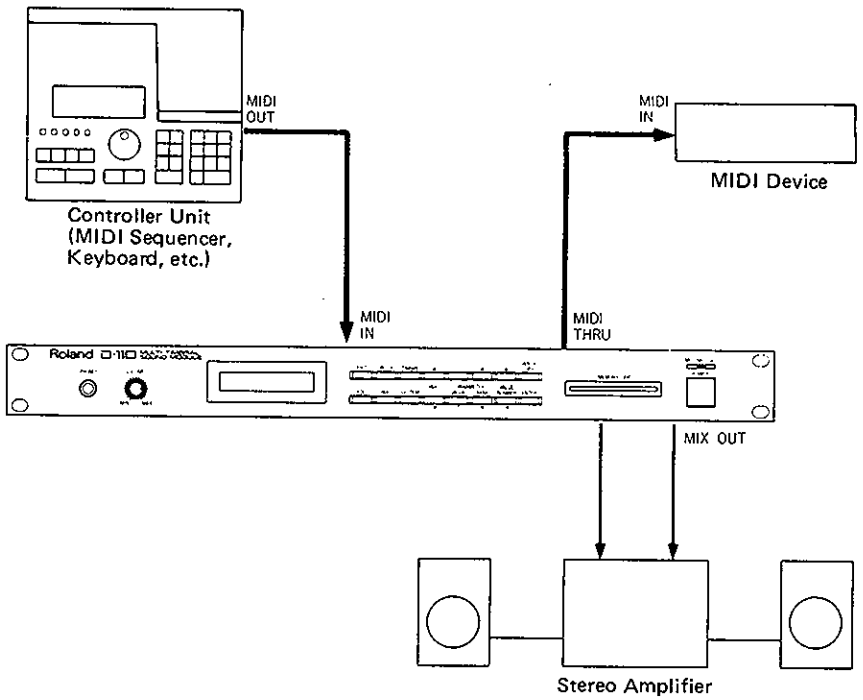

In brief, Parts works like conventional MIDI sound modules, and Timbres like Patches in a sound module.

## 4. Partials and the maximum Voices

The D-110 can produce a maximum of 32 voices using 32 Partials at the same time. A Partial is the smallest unit of a sound within the D-110. A Tone consists one to four Partials for each voice. A Tone made of only one Partial can be played using 32 voices, but a Tone using two Partials has 16 voices, and a Tone using four Partials is 8 voice polyphonic. It is very important that you have a full understanding of this concept. This can be very tricky as several Tones are involved at the same time.

# 2 CONNECTIONS






* Through the MIDI THRU connector, an exact copy of the messages fed through the MIDI IN is sent out. Using the MIDI THRU connector, more than one MIDI sound module can be controlled by one controller unit. Technically speaking, many MIDI devices can be connected, but in practice, connecting more than a few devices may cause problems. For connection of more than three units, use the optional MIDI Output Selector MPU-105.

* Usually, the MIDI messages fed into the MIDI IN are not sent through the MIDI OUT.

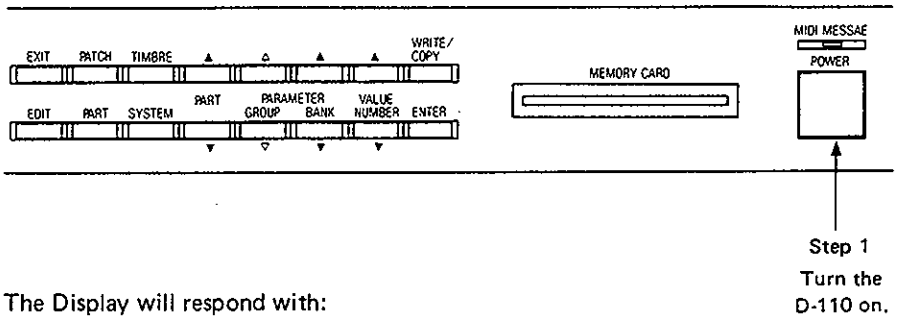
* Through the Mix Output Sockets, those Parts ( = Timbre) whose Output Assign is set to MIX are sent in stereo. Each Multi Output Socket sends a specific signal, as set by each Timbre.

# 3 PLAYING THE D-110

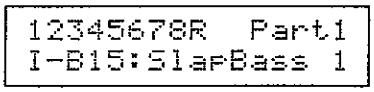
The D-110 is played by MIDI messages sent from an external MIDI device.

## 1. Power up

Step 1 Make sure that the D-110 is correctly set up with an external device, then turn the D-110 on.




The Display will respond with:



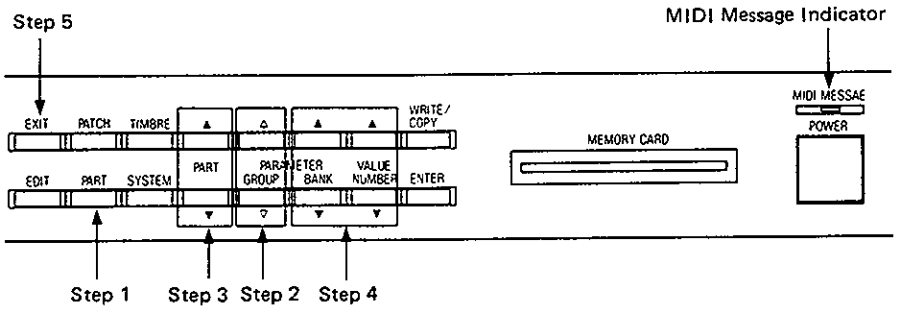

Play Mode Display

Step 2 Turn on the controller unit connected to the D-110.

## 2. MIDI Channel Setting

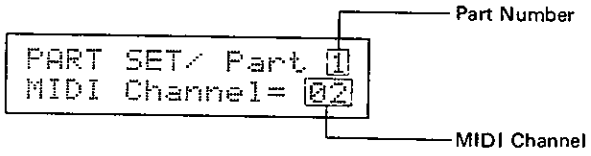
The MIDI channels of the connected devices should be set to the same number. If the MIDI receive channel of the D-110 is not set correctly, MIDI messages sent from an external device cannot be received properly, therefore the D-110 cannot be played as it should be. The D-110 allows you to set a different MIDI channel for each Part.

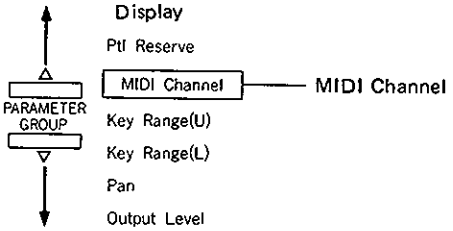
If you wish to change them, do as follows.




Step 1 Push PART.

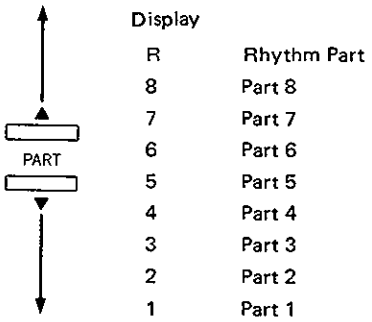
Step 2 Using PARAMETER/GROUP (▽△), call the MIDI channel setting Display.




Step 3 Using PART (▲▼), select the Part whose MIDI channel you wish to change.

Pushing ▲ increases the number and ▼ decreases the number.




Step 4 Using PARAMETER/BANK (▲▼), VALUE/NUMBER (▲▼), set the MIDI channel for the Part.

Pushing ▲ increases the number, and ▼ decreases it.
The PARAMETER/BANK (▲▼) number will change in two steps.

* At OFF, MIDI messages are not received.

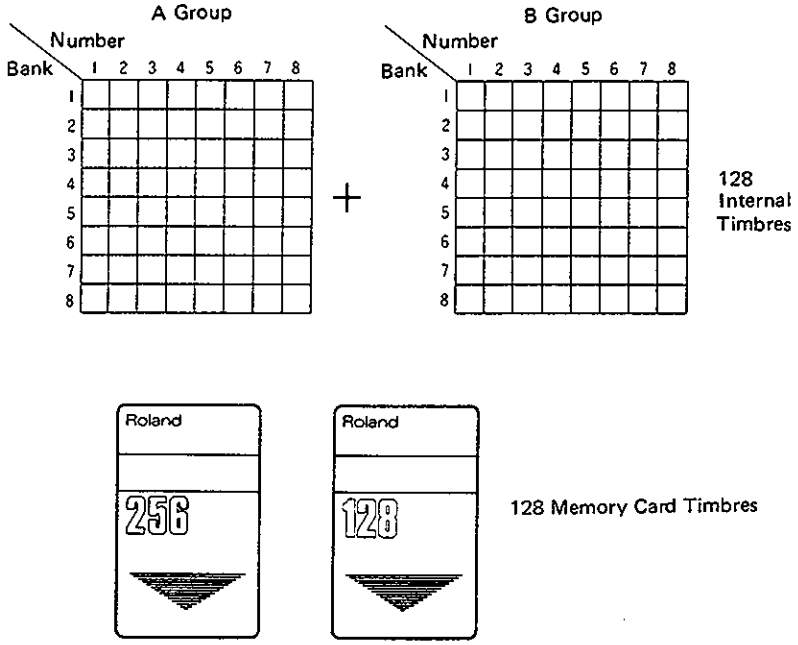
* When the D-110 receives MIDI messages from the controller unit, the MIDI Indicator will light up.

Step 5 Push EXIT to return to the Play mode.

* The MIDI channel you have set will be erased by selecting a different Patch. To retain the new channel you have set, take the appropriate Patch Writing procedure (see page 28).

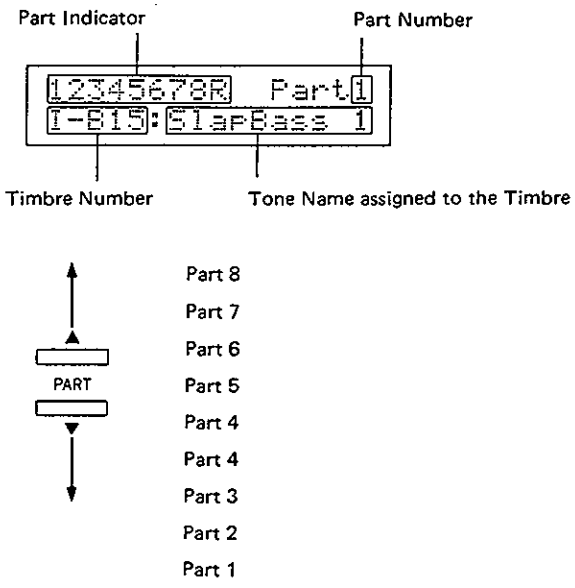
# 3. Timbre Selection (Changing the sound in each Part)

A Timbre is represented as a Group (A or B), Bank (1 – 8) and Number (1 – 8). The internal memory of the D-110 can store up to 128 different Timbres, and another 128 Timbres can be stored on a memory card, allowing storage of 256 Timbres altogether.



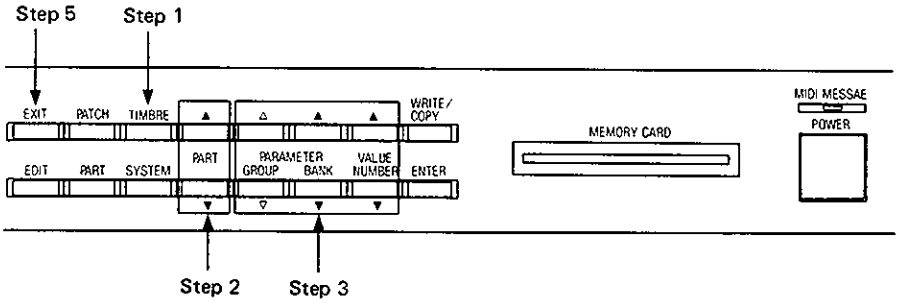

**[Monitoring a Timbre in each Part]**

You can monitor the Timbre assigned to each Part as follows.
Call the Part Display you wish to monitor using the PART (▲▼) buttons.




* The corresponding Part Indicator flashes to the performance.

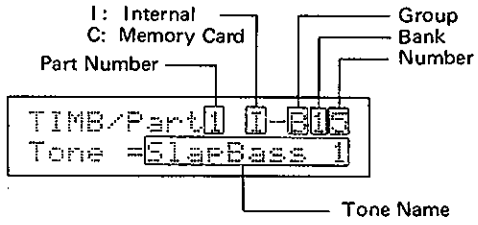
## [Selecting a Timbre from the D-110]






Step 1 Push TIMBRE.

The Display shows the Timbre Number ( = Group, Bank and Number) of the Timbre assigned to the Part currently selected and the Tone name used for the timbre.




Step 2 Using PART (▲▼), select the Part where you wish to assign a different Timbre.

Step 3 Assign the Group with PARAMETER/GROUP (▽△), assign the Bank with the PARAMETER/BANK (▲▼), assign the Number with the VALUE/NUMBER (▲▼) for selecting the new Timbre to be used for the Part.

To select the Internal or Memory Card mode, use the PARAMETER/GROUP (▽△).

* If a memory card is not connected to the Card Slot, or a memory card which contains data from another instrument (i.e., not a D-110, D-10 or D-20) is used, an Error Message will appear in the Display. (See page 20 "Memory Card".)

* The D-110's maximum number of voices played simultaneously changes depending on how the selected Timbre is programmed.

Step 4 Repeat Steps 2 and 3.

Step 5 Push EXIT to return to the Play mode.

## [Selecting a Timbre with Program Change messages]

The Timbre can be changed using the Program Change messages sent from the controller unit.
Turn the D-110 to the Play mode, and send Program Change messages on the MIDI channel of the relevant Part, and the Timbre of that Part will be changed.

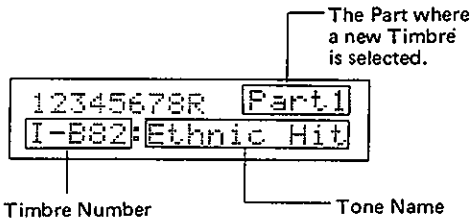
Program Change numbers correspond with the Timbre Numbers of the D-110 as shown in the table below.

| Group | Number / Bank | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| A | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | 2 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | 3 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| | 4 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| | 5 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| | 6 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| | 7 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 |
| | 8 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 |
| B | 1 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 |
| | 2 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| | 3 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 |
| | 4 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 |
| | 5 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 |
| | 6 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| | 7 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 |
| | 8 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |

* Number 0 to 127 are used as Program Change Messages in the actual MIDI Format.

* When the Timbre in the Part currently in use is an internal Timbre, the received Program Change number will select the corresponding Timbre in the internal memory. If the Timbre comes from a memory Card, the same Program Change number will select the corresponding Timbre on the memory card.

The Display shows the new Timbre Number you have assigned to the Part and the Names of the Tones used for the Timbre.

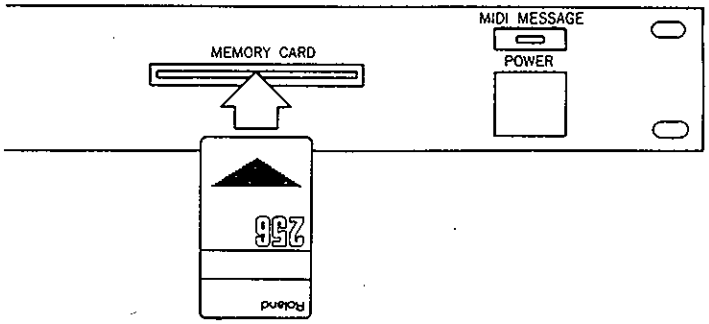



# 4. Memory Card

A memory card can be used for saving Patch/Timbre/Tone or Rhythm Setup data.

* A brand new memory card (M-256D or M-128D) does not contain any data, and therefore cannot be used unless the entire data in the internal memory is first copied onto it (as explained on page 85 "Copying the internal data onto a memory card"). Also, when you are using a memory card which contains data other than the D-110's, take the same copying procedure.

Insert the memory card into the Card Slot in the correct direction.






* If you try to select a Tone or Timber on a memory card, with no memory card connected, or connected incorrectly, the following will appear in the Display for a while. If this happens, the Tone or Timbre is not changed.

```
Card Not Ready
```

* If you use a memory card that contains data for other than a D-110, D-10 or D-20, the following Display is shown for a while. If this happens, the Tone or Timbre is not changed. (Only Timbre/Rhythm Setup data on a memory card for the D-10 and D-20 can be used.)

```
Illegal Card
```

There are two types of memory cards;

- **ROM card**

Data saved on a ROM card cannot be edited but preserved safely.

- **RAM card**

Data on a RAM card can be edited as many times as you like. To support the data, a backup system that protects data saved on a card even when the unit is turned off is built in. The optional memory cards (M-256D and M-128D) are RAM cards.

For saving the D-110's data, a memory card, M-256D or M-128D can be used. The memory capacity of the M-256D is larger than the M-128D, and the data which can be stored differs as shown below.

| | M-256D | M-128D |
|---|---|---|
| Tone | 64 | 32 |
| Timbre | 128 | 128 |
| Patch | 64 | 32 |
| Rhythm Setup | 1 | 1 |

* When using the M-128D memory card, Tones c33 to c64 are exactly the same as c01 to c32, and Patches C-51 to C-88 are the same Patches as C-11 to C-48.

* An M-128D memory card that contains data for the D-110 cannot be used for the D-10 or D-20. Only the data of Tone and Timbre of the M-256D in the same condition can be used with the D-10 or D-20.

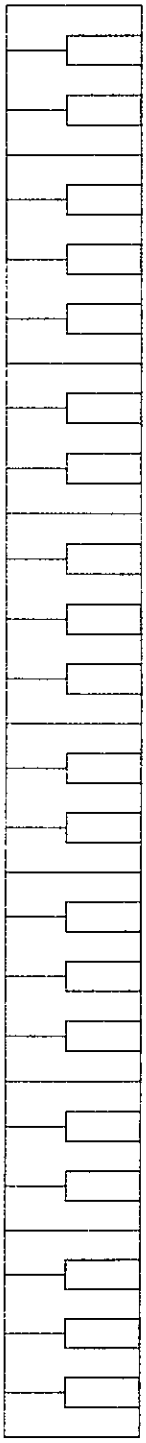
# 5. Rhythm Part Play

A different Rhythm Tone can be assigned to each key in the Rhythm Part, and will therefore be played by MIDI key messages sent from an external controller unit.

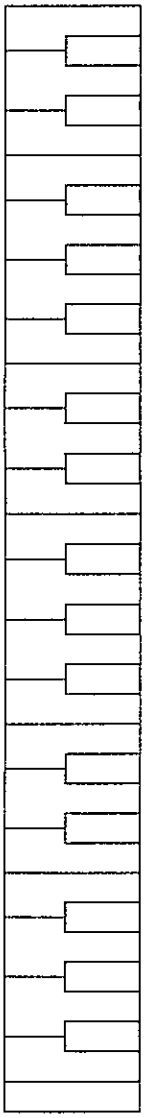
Preset Rhythm Tones have been assigned to Key numbers by the manufacturer as shown below.

Initial Setting of Rhythm Tones

| Note Name | Tone No. | Tone Name | No. of Partials |
|---|---|---|---|
| C1 (24) | r64 | OFF | (0) |
| C♯1(25) | r64 | OFF | (0) |
| D1 (26) | r64 | OFF | (0) |
| D♯1(27) | r64 | OFF | (0) |
| E1 (28) | r64 | OFF | (0) |
| F1 (29) | r64 | OFF | (0) |
| F♯1(30) | r64 | OFF | (0) |
| G1 (31) | r64 | OFF | (0) |
| G♯1(32) | r64 | OFF | (0) |
| A1 (33) | r64 | OFF | (0) |
| A♯1(34) | r64 | OFF | (0) |
| B1 (35) | r15 | Bass Drum-1 | 2 |
| C2 (36) | r16 | Bass Drum-2 | 1 |
| C♯2(37) | r25 | Rim Shot | 1 |
| D2 (38) | r19 | Snare Drum-1 | 1 |
| D♯2(39) | r39 | Hand Clap | 1 |
| E2 (40) | r20 | Snare Drum-2 | 1 |
| F2 (41) | r30 | Low Tom Tom-1 | 1 |
| F♯2(42) | r01 | Closed High Hat-1 | 1 |
| G2 (43) | r33 | Low Tom Tom-2 | 1 |
| G♯2(44) | r04 | Open High Hat-2 | 2 |
| A2 (45) | r29 | Middle Tom Tom-1 | 1 |
| A♯2(46) | r03 | Open High Hat-1 | 2 |
| B2 (47) | r32 | Middle Tom Tom-2 | 1 |
| C3 (48) | r28 | High Tom Tom-1 | 1 |
| C♯3(49) | r05 | Crash Cymbal | 2 |
| D3 (50) | r31 | High Tom Tom-2 | 1 |
| D♯3(51) | r08 | Ride Cymbal | 2 |
| E3 (52) | r13 | China Cymbal | 2 |
| F3 (53) | r11 | Cup | 2 |
| F♯3(54) | r40 | Tambourine | 1 |
| G3 (55) | r14 | Splash Cymbal | 1 |
| G♯3(56) | r41 | Cowbell | 1 |
| A3 (57) | r07 | Crash Cymbal (Mute) | 1 |
| A♯3(58) | r21 | Snare Drum-3 | 1 |
| B3 (59) | r10 | Ride Cymbal (Mute) | 1 |
| C4 (60) | r42 | High Bongo | 1 |
| C♯4(61) | r43 | Low Bongo | 1 |
| D4 (62) | r44 | High Conga (Mute) | 1 |
| D♯4(63) | r45 | High Conga | 1 |
| E4 (64) | r46 | Low Conga | 1 |
| F4 (65) | r47 | High Timbale | 1 |
| F♯4(66) | r48 | Low Timbale | 1 |
| G4 (67) | r49 | High Agogo | 1 |
| G♯4(68) | r50 | Low Agogo | 1 |
| A4 (69) | r51 | Cabasa | 1 |
| A♯4(70) | r52 | Maracas | 1 |
| B4 (71) | r53 | Short Whistle | 2 |



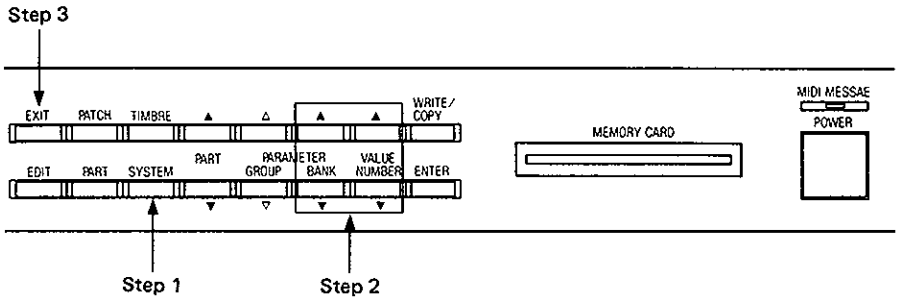

| Note Name | Tone No. | Tone Name | No. of Partials |
|---|---|---|---|
| C5 (72) | r54 | Long Whistle | 2 |
| C♯5(73) | r55 | Quijada | 3 |
| D5 (74) | r12 | Cup (Mute) | 1 |
| D♯5(75) | r56 | Claves | 1 |
| E5 (76) | r26 | Brush-1 | 2 |
| F5 (77) | r27 | Brush-2 | 2 |
| F♯5(78) | r57 | Castanets | 2 |
| G5 (79) | r38 | High Pitch Tom Tom-2 | 1 |
| G♯5(80) | r58 | Triangle | 2 |
| A5 (81) | r37 | High Pitch Tom Tom-1 | 1 |
| A♯5(82) | r59 | Wood Block | 1 |
| B5 (83) | r60 | Bell | 2 |
| C6 (84) | r17 | Bass Drum-3 | 2 |
| C♯6(85) | r18 | Bass Drum-4 | 1 |
| D6 (86) | r22 | Snare Drum-4 | 2 |
| D♯6(87) | r23 | Snare Drum-5 | 1 |
| E6 (88) | r24 | Snare Drum-6 | 1 |
| F6 (89) | r36 | Low Tom Tom-3 | 2 |
| F♯6(90) | r02 | Closed High Hat-2 | 1 |
| G6 (91) | r35 | Middle Tom Tom-3 | 2 |
| G♯6(92) | r06 | Crash Cymbal (Short) | 1 |
| A6 (93) | r34 | High Tom Tom-3 | 2 |
| A♯6(94) | r09 | Ride Cymbal (Short) | 1 |
| B6 (95) | r61 | Native Drum-1 | 1 |
| C7 (96) | r62 | Native Drum-2 | 1 |
| C♯7(97) | r63 | Native Drum-3 | 1 |
| D7 (98) | r64 | OFF | (0) |
| D♯7(99) | r64 | OFF | (0) |
| E7 (100) | r64 | OFF | (0) |
| F7 (101) | r64 | OFF | (0) |
| F♯7(102) | r64 | OFF | (0) |
| G7 (103) | r64 | OFF | (0) |
| G♯7(104) | r64 | OFF | (0) |
| A7 (105) | r64 | OFF | (0) |
| A♯7(106) | r64 | OFF | (0) |
| B7 (107) | r64 | OFF | (0) |
| C8 (108) | r64 | OFF | (0) |




* Rhythm sound is not available at r64.

# 6. Master Tuning

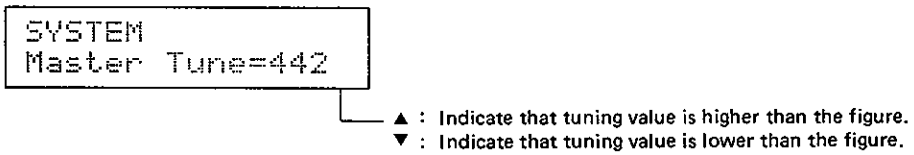
The Master Tuning function can be used for tuning the D-110 to another instrument.






Step 1 Push SYSTEM.

The Display shows the current Master Tuning value.


SYSTEM
Master Tune=442
▲ : Indicate that tuning value is higher than the figure.
▼ : Indicate that tuning value is lower than the figure.

Step 2 Turn the D-110 using PARAMETER/BANK (▲▼) and VALUE/NUMBER (▲▼).

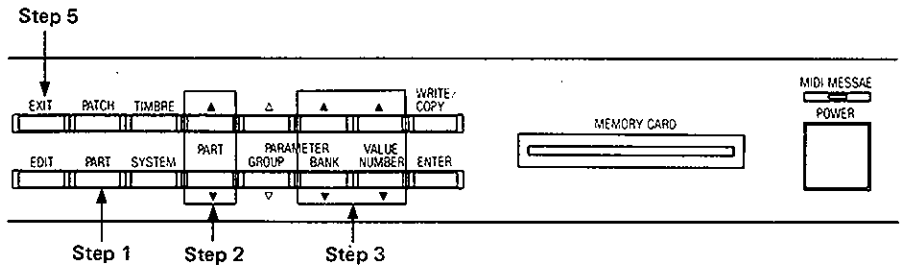
Pushing PARAMETER/BANK (▲▼) changes values in approx. 2 Hz steps, and pushing VALUE/NUMBER (▲▼) changes the number continuously. ▲ button increases numbers, and ▼ button decreases, while holding the button down quickens the changes.
The number shown in the Display refers to the frequency of the standard pitch (A4).

Step 3 When finished, push EXIT to return to the Play mode.

* The Master Tune you have set will be retained even after the unit is turned off.

# 7. Level Adjustment

The volume of each Part (1 to 8 and the Rhythm Part) can be set separately, by adjusting the volume balance of each Part. In the Rhythm Part, it is also possible to set a different volume for each Key number.



Step 1 Push PART.

The Display shows the level of the Part currently selected.

Step 2 Select the Part whose volume you wish to change with PART (▲▼).

Step 3 Set a desired level using PARAMETER/BANK (▲▼) and VALUE/NUMBER (▲▼) between 0 and 100.

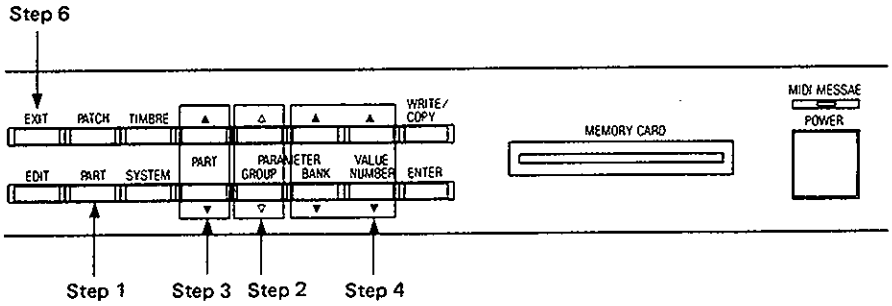
Pushing PARAMETER/BANK (▲▼) changes the number in steps of 10. ▲ button increases the number, and ▼ button decreases.

Step 4 Repeat Steps 2 and 3.

Step 5 When finished, push EXIT to return to the Play mode.

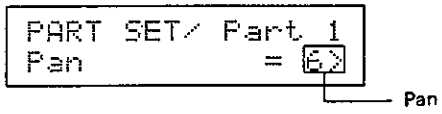
# 8. Pan Setting

Pan is the positioning of a sound image of each Part output in stereo from the Mix Outputs. By setting the Pan value for each Part, the balance of the stereo output can be changed. In the Rhythm Part, a different Pan value can be set for each Key number. (page 79)




Step 1 Push PART.

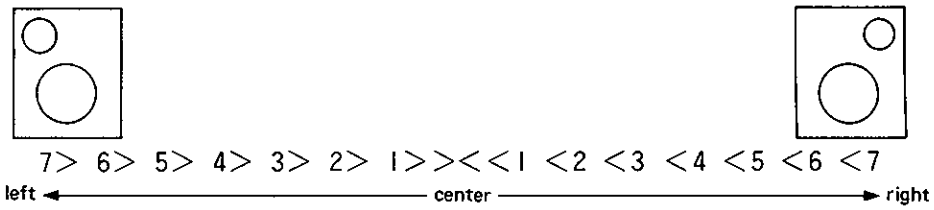
Step 2 Using the PARAMETER/BANK (▲▼) and VALUE/NUMBER (▲▼), set the desired value.




Step 3 Select a Part whose Pan setting is to be edited using the Part (▲ ▼) buttons.

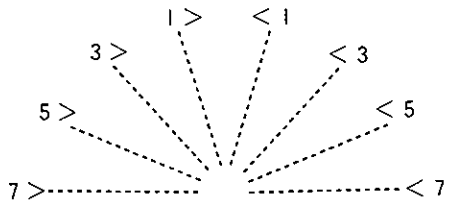
Step 4 Using the PARAMETER/BANK (▲▼) and VALUE/NUMBER (▲▼) buttons, set the value for Pan.

A Pan value actually creates a sound image as shown below.




* When the Structure of monaural output is used the actual changes of panning will be as shown below.






* When Structure 8 or 9 is selected, the relation of the Pan values and the actual sound images created differs as shown below.

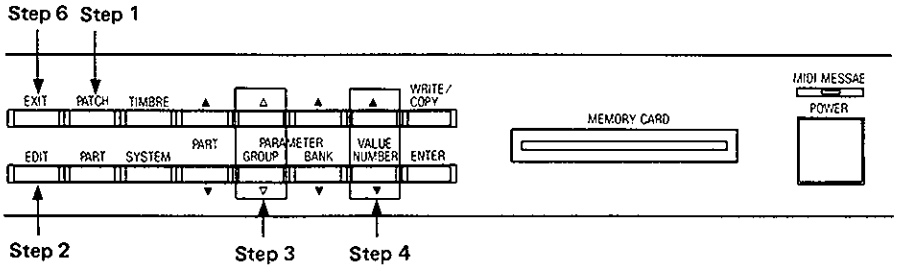
| Value | Partial 1(3) | Partial 2(4) |
|---|---|---|
| <7 | <7 | <7 |
| <6 | <5 | <7 |
| <5 | <3 | <7 |
| <4 | <1 | <7 |
| <3 | 1> | <7 |
| <2 | 3> | <7 |
| <1 | 5> | <7 |
| >< | 7> | <7 |
| 1> | 7> | <5 |
| 2> | 7> | <3 |
| 3> | 7> | <1 |
| 4> | 7> | 1> |
| 5> | 7> | 3> |
| 6> | 7> | 5> |
| 7> | 7> | 7> |

Step 5 Repeat Steps 3 and 4.

Step 6 When finished, push EXIT to return to the Play mode.

# 9. Reverb Setting

The D-110 features a built-in digital reverb. By changing the values of the Reverb parameters, various reverb effects can be obtained.



Step 1 Push PATCH.

Step 2 Push EDIT.

The Display shows all the Patch Parameters.

Step 3 Using PARAMETER/GROUP (▽△), select the parameter to be edited.

The Reverb parameters are Reverb Type, Reverb Time and Reverb Level.

| Display | |
|---|---|
| Reverb Level | Reverb Level |
| Reverb Time | Reverb Time |
| Reverb Type | Reverb Type |
| Name | Patch Name |

Step 4 Change the value using VALUE/NUMBER (▲▼).

Step 5 Repeat Steps 3 and 4.

Step 6 When finished, push EXIT twice to return to the Play mode.

REVERB PARAMETERS

- **Reverb Type**

This selects one of the following Reverb Types.

| Value | Reverb Type |
|---|---|
| 1 | Small Room |
| 2 | Medium Room |
| 3 | Medium Hall |
| 4 | Large Hall |
| 5 | Plate |
| 6 | Delay 1 |
| 7 | Delay 2 |
| 8 | Delay 3 |
| OFF | No Reverb |

- **Reverb Time**

This sets the reverberation time. 1 to 8 are valid, higher values making longer times.

* When the Reverb Type is set to Delay, Delay Time can be controlled with the Reverb Time Parameter.

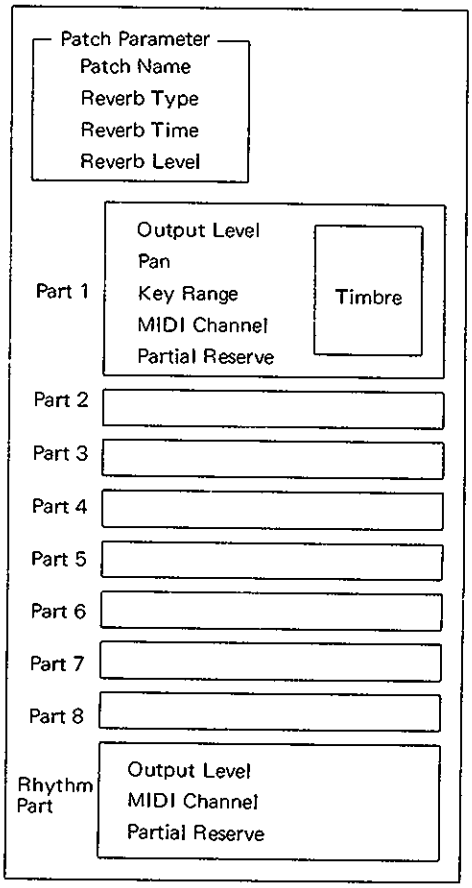
- **Reverb Level**

This sets the depth of reverb effect. 0 to 7 are valid, higher values deepening the effect.

* When the Reverb Level parameter is set to 0, no reverb effect is obtained.

# 4 PATCHES

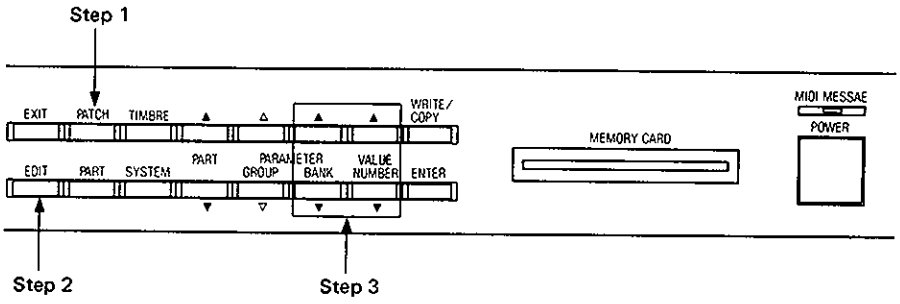
A Patch consists of Timbres assigned to 1 to 8 Parts, Level and Pan values for each Part, Reverb setting, etc. The D-110's internal memory can store up to 64 Patches and a memory card can store another 64 Patches, allowing 128 Patches altogether.






**[Patch Name]**

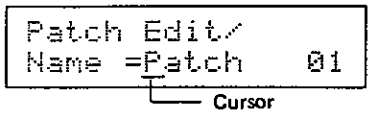
A Patch can be named using up to 10 letters. A Patch Name is useful for finding a Patch quickly.




Step 1 Push PATCH.

Step 2 Push EDIT.

The Display shows the Patch Name with the cursor under the first letter.

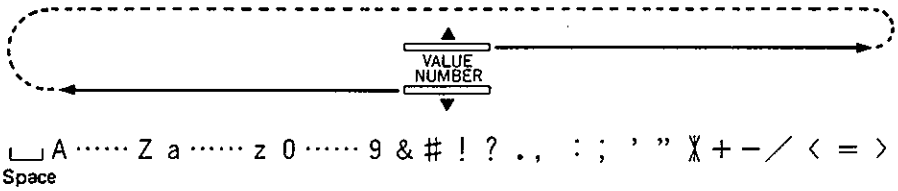



Step 3 Using the PARAMETER/BAND (▲▼), move the cursor under the letter which you wish to change, then rewrite the letter with VALUE/NUMBER (▲▼).

Set a desired value.

Pushing PARAMETER/BANK ▲ moves the cursor to the right and ▼ moves to the left.

The letters which can be written with VALUE/NUMBER (▲▼) are:

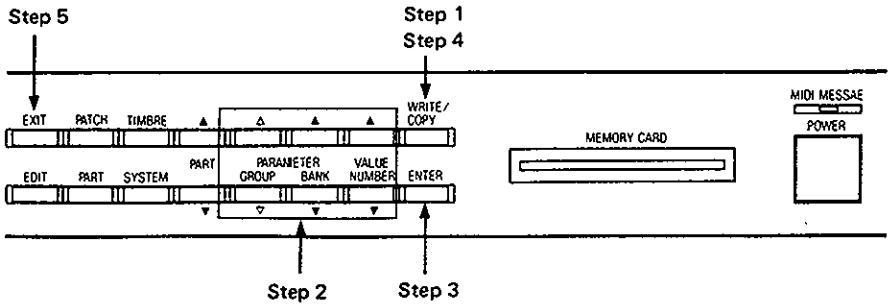



# 1. Patch Writing

A Patch you have made will be erased by selecting a different Patch. To retain the Patch, follow the Patch Writing procedure.

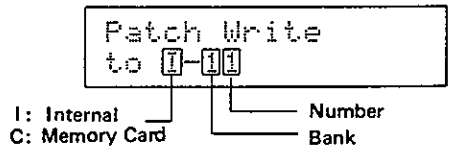
**[Patch Writing Procedure]**

Turn the unit to the Patch Select or Patch Edit mode, then do as follows.




Step 1 Push WRITE/COPY button.

The Display shows the Patch Number currently selected.




Step 2 Assign the destination Patch Number (= location) where you wish to write the source Patch. Assign a Internal/Memory Card with PARAMETER/GROUP (△▽), a Bank with PARAMETER/BANK (▲▼) and a Number with VALUE/NUMBER (▲▼).

Step 3 Push ENTER.

The Display responds as below to confirm if the destination Patch Number is correct.

```
Patch Write
to I-11    Sure?
```

Step 4 If it is correct, push WRITE/COPY.

If the Memory Protect function is set to ON, the Display responds with:

```
Memory Protected
Turn off once ?
```



* To leave the writing mode, push EXIT. The Display will return to its previous condition, before any writing procedure was taken.

When the Patch is written into memory, the Display shows as below for a while, then returns to its previous condition, before any writing procedure was taken.

```
Complete
```

Step 5 Push EXIT twice to return to the Play mode.

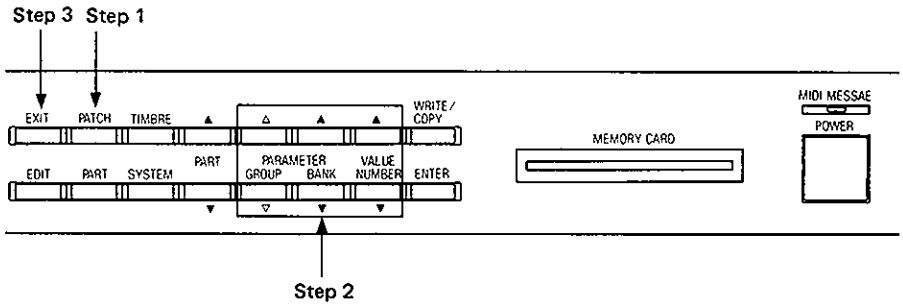
If you call a Patch you have written, the relevant Patch number will be shown at the position where a Timbre number is normally shown.

```
TIMB/Part1 P-I12
Tone =SlapBass 2
```

## 2. Patch Selection

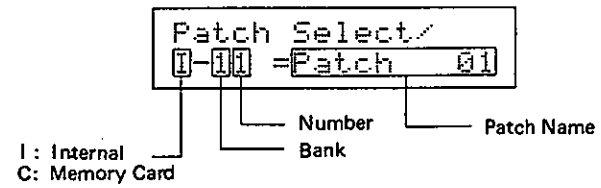
**[Patch Selection from the D-110]**

Any of the 64 Patches in the internal memory, or another 64 on a memory card can be selected instantaneously.




Step 1 Push PATCH.

The Display shows the Patch Number and Patch Name of the Patch currently selected.



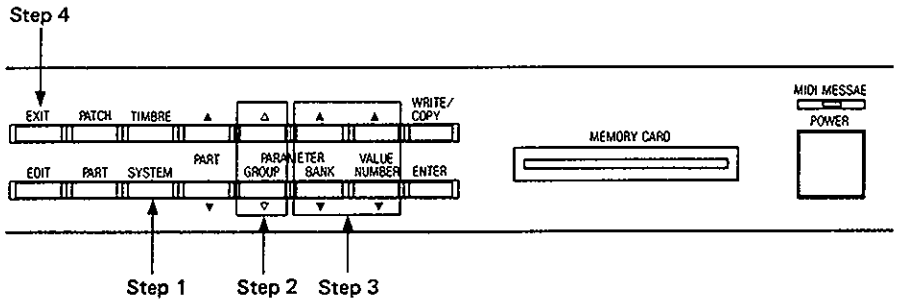

Step 2 Select the Internal or Memory Card mode with PARAMETER/GROUP (▽△), select a Bank with PARAMETER/BANK (▲▼), then select a Number with VALUE/NUMBER (▲▼).

Step 3 Push EXIT to return to the Play mode.

**[Changing Patches with Program Change messages]**

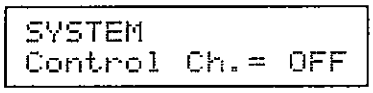
You can also change Patches with Program Change messages sent from an external controller unit. Program Change messages for Patch selection are received on the Control channel.

- **Setting the Control Channel**




Step 1 Push SYSTEM.

Step 2 Select PARAMETER/GROUP (▽△) twice to call the Control Channel Display.




Step 3 Set the Control Channel with PARAMETER/BANK (▲▼) and VALUE/NUMBER (▲▼).

1 to 16, and OFF are valid for a Control Channel number. At OFF, Program Change messages for Patch selection are not received.

Step 4 Push EXIT to return to the Play mode.

* The Control Channel you have set will be retained in memory even after unit is switched off.

Program Change numbers correspond to the Patch Numbers as shown below.

| | Bank \ Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| Internal | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | 2 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | 3 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| | 4 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| | 5 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| | 6 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| | 7 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 |
| | 8 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 |
| Memory Card | 1 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 |
| | 2 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| | 3 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 |
| | 4 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 |
| | 5 | 97 | 99 | 99 | 100 | 101 | 102 | 103 | 104 |
| | 6 | 105 | 107 | 107 | 108 | 109 | 110 | 111 | 112 |
| | 7 | 113 | 115 | 115 | 116 | 117 | 118 | 119 | 120 |
| | 8 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |

* 0 to 127 Program Change messages are transmitted.

* If a MIDI channel set in a Part (1 – 8) is same as the Control channel, a Patch will be changed after receiving Program Change message of the MIDI channel.

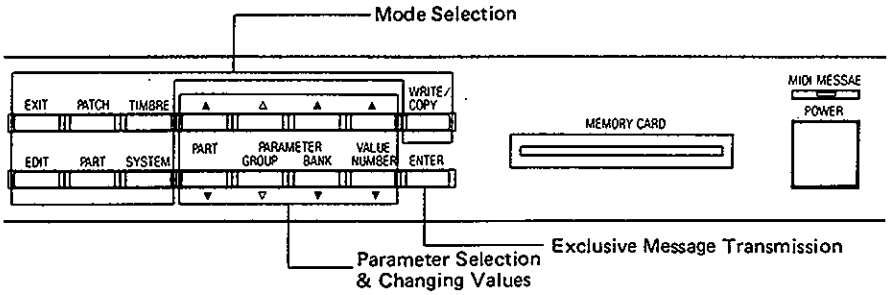
# ADVANCED COURSE


1 BASIC PROCEDURES
2 PATCH EDITING
3 TIMBRE EDITING
4 TONE EDITING
5 PART SETTING
6 WRITING
7 RHYTHM SETUP
8 SYSTEM SETUP
9 DATA TRANSFER
10 ROM PLAY

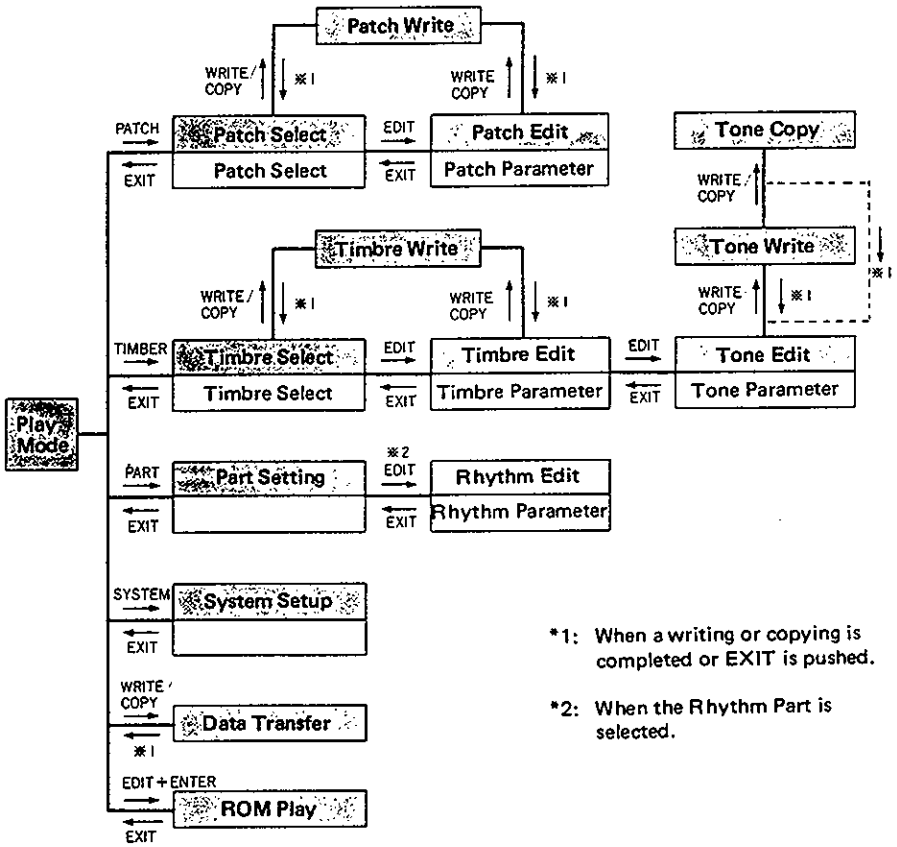
# 1 BASIC PROCEDURES

## 1. Basic Procedure for Editing Parameters

The D-110 has several modes and a great many parameters, offering sound synthesis and various effects using the Multi Timbral function.
To edit a parameter, you should turn the unit to the appropriate mode for the each parameter.




The following shows how the relevant buttons work in each mode.




*1: When a writing or copying is completed or EXIT is pushed.

*2: When the Rhythm Part is selected.

* If you cannot remember which mode you are in, push EXIT until the unit returns to the Play mode.

Depending on which mode is currently selected, the PART (▲▼), PARAMETER/GROUP (▽△), PARAMETER/BANK (▲▼) and VALUE/NUMBER (▲▼) buttons function differently.

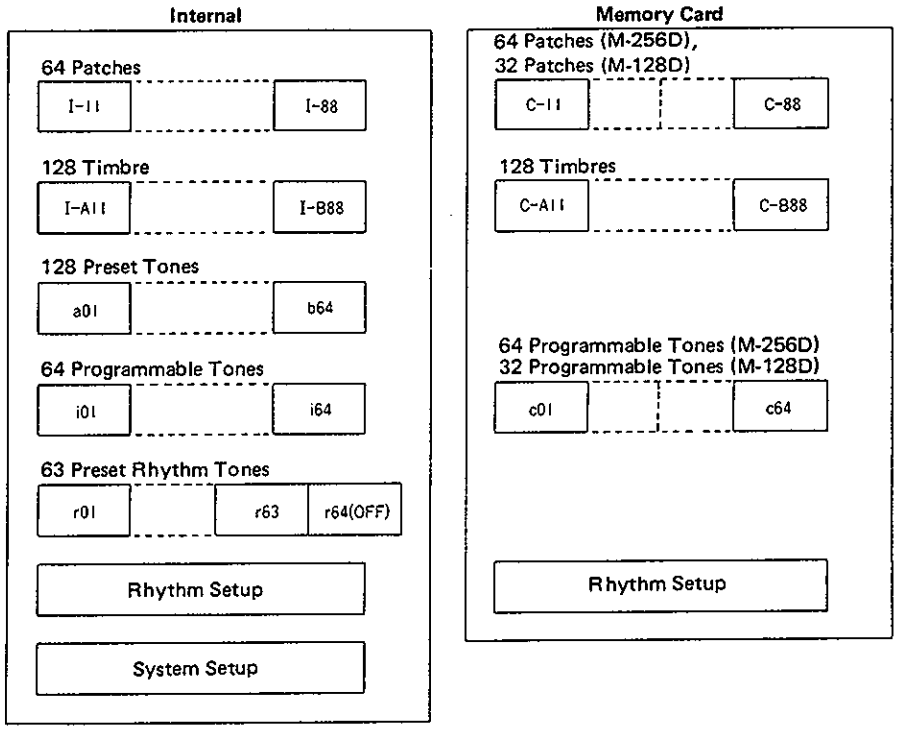
| | PART▲▼ | PARAMETER | | VALUE/NUMBER▲▼ |
|---|---|---|---|---|
| | | GROUP▽△ | BANK▲▼ | |
| Play Mode | Part Select | | ——— | ——— |
| Patch Select | ——— | Group Select | Bank Select | Number Select |
| Patch Edit | | | | |
| Patch Name | Part Select | Parameter Select | Cursor Movement | Value Change |
| Reverb | Part Select | Parameter Select | Value Change (x2) | Value Change |
| Patch Write | ——— | Group Select | Bank Select | Number Select |
| Timbre Select | Part Select | Group Select | Bank Select | Number Select |
| Timbre Edit | | | | |
| Tone | Part Select | Parameter Select | Tone Group Select | Tone Number Select |
| Key Shift | Part Select | Parameter Select | Value Change (X12) | Value Change |
| Fine Tune | Part Select | Parameter Select | Value Change (X10) | Value Change |
| Bender Range | Part Select | Parameter Select | Value Change (X12) | Value Change |
| Assign Mode | Part Select | Parameter Select | Value Change (X 2) | Value Change |
| Output Assign | Part Select | Parameter Select | Value Change (X 2) | Value Change |
| Timbre Write | ——— | Group Select | Bank Select | Number Select |
| Tone Edit | | | | |
| Common Name | Parameter Block Select | Parameter Select | Cursor Movement | Charactor Select |
| Structure | Parameter Block Select | Parameter Select | Value Change (X10) | Value Change |
| Partial Mute | Parameter Block Select | Parameter Select | Cursor Movement | Value Change |
| Envelope Mode | Parameter Block Select | Parameter Select | Value Change | Value Change |
| Partial Parameter | Parameter Block Select | Parameter Group Select | Parameter Select | Value Change |
| Tone Write | ——— | ——— | Tone Group Select | Tone Number Select |
| Copy Tone | Part Select | ——— | ——— | ——— |
| Copy Partial | Part Select | Partial Select | ——— | ——— |
| Part Setting | | | | |
| Output Level | Part Select | Parameter Select | Value Change (X10) | Value Change |
| Pan | Part Select | Parameter Select | Value Change (X 7) | Value Change |
| Key Range | Part Select | Parameter Select | Value Change (X12) | Value Change |
| MIDI Channel | Part Select | Parameter Select | Value Change (X 2) | Value Change |
| Partial Reserve | Part Select | Parameter Select | Value Change (X 2) | Value Change |
| Rhythm Setup | | | | |
| Tone | Note Name Select | Parameter Select | Tone Group Select | Tone Number Select |
| Output Level | Note Name Select | Parameter Select | Value Change (X10) | Value Change |
| Pan | Note Name Select | Parameter Select | Value Change (X 7) | Value Change |
| Output Assign | Note Name Select | Parameter Select | Value Change (X 2) | Value Change |
| System Setup | | | | |
| Master Tune | ——— | Parameter Select | Value Change (X10) | Value Change |
| Memory Protect | ——— | Parameter Select | Value Change | Value Change |
| Control Channel | ——— | Parameter Select | Value Change (X 2) | Value Change |
| Exclusive Unit Number | ——— | Parameter Select | Value Change (X 2) | Value Change |
| Overflow Assign Switch | ——— | Parameter Select | Value Change | Value Change |
| Data Transfer | ——— | Function Select | Data Select | ——— |
| ROM Play | ——— | ——— | ——— | Song Select |

# 2. Memory

There are several different types of data, such as Patch, Timber, Tone, etc. Each data unit consists of different things.

**[Data which can be written in the internal memory or on a memory card]**

The D-110's internal memory and a memory card (M-256D or M-128D) can store the following data.



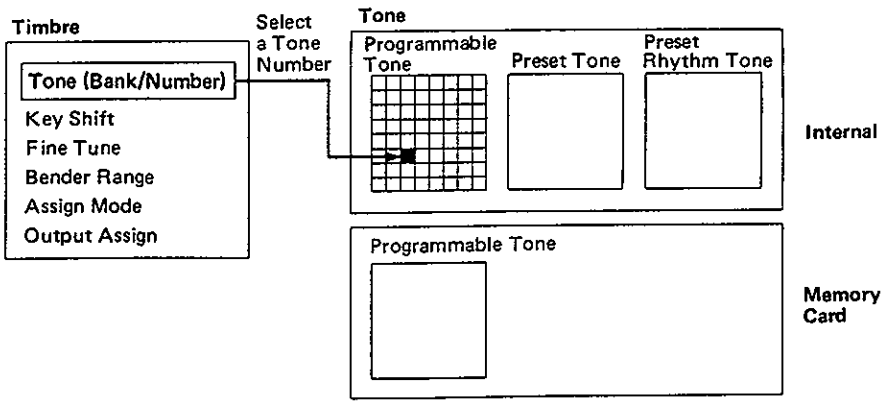

**[What each unit consist of?]**

- **Tone**

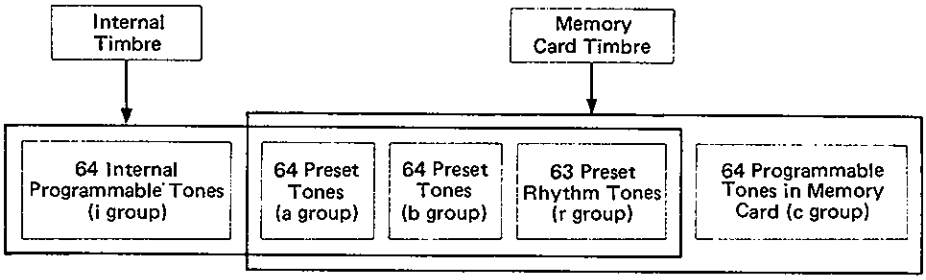
A Tone consists of Common and Partial blocks.

- **Timbre**

A Timbre consists of Timbre Parameters; Tone Select, Key Shift, Fine Tune, Bender Range, Assign Mode, Output Assign. In other words, a Timbre is made of Tones and performance controlling functions. A Timbre, however, does not contain a Tone itself.



Tones which can be assigned to a Timbre are as follows:


Internal Timbre
Memory Card Timbre
64 Internal Programmable Tones (i group)
64 Preset Tones (a group)
64 Preset Tones (b group)
63 Preset Rhythm Tones (r group)
64 Programmable Tones in Memory Card (c group)

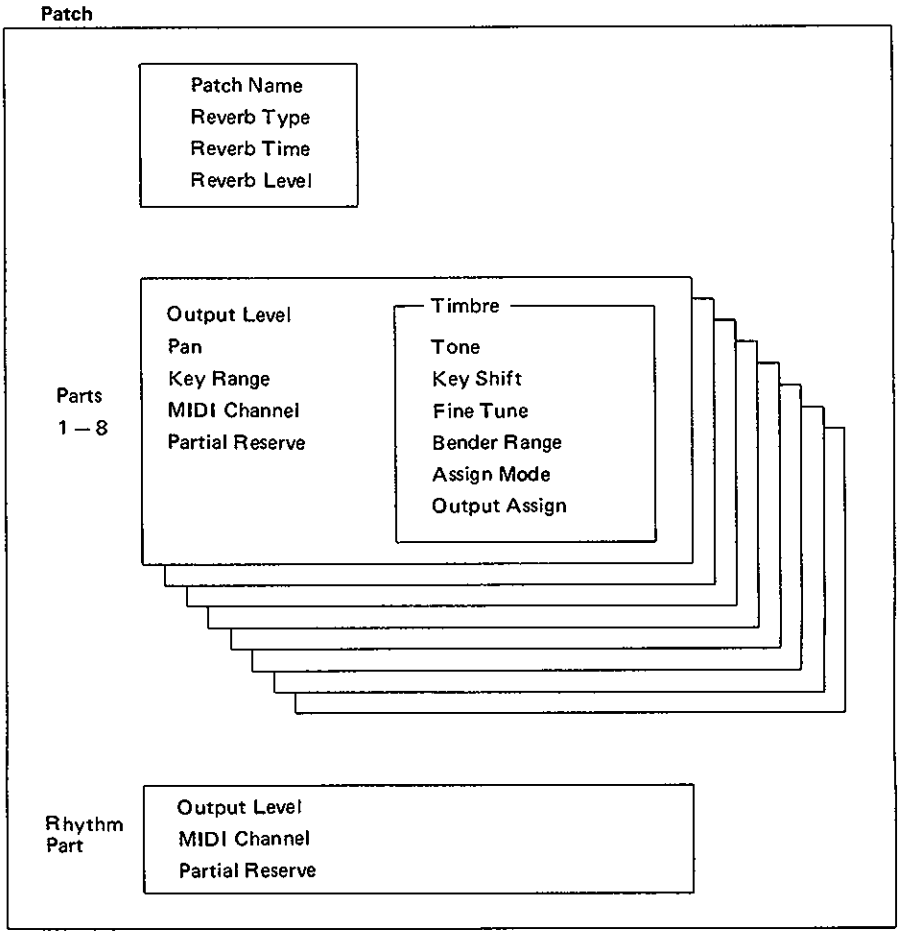
Preset Tones(a, b, or r group) can be assigned to the Timbres either the Internal or on a Memory Card, while Programmable Tones are assinged to the Timbres in the corresponding memory; a Programmable Tone in the Internal memory assigned to the Timbre in the Internal memory and that in a memory card to the Timbre in a memory card.

1

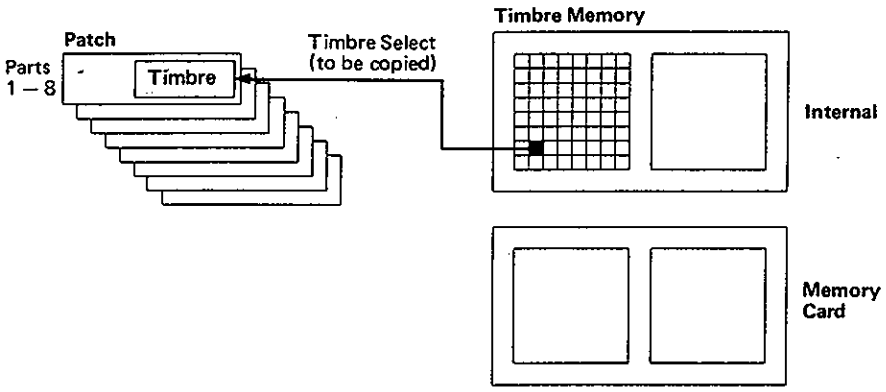
While you are writing a Timbre onto a memory card, if a Tone in the Internal memory(i group) is assigned to that Timbre, it will be automatically changed to a Tone in the Internal memory(c group).

- **Patch**

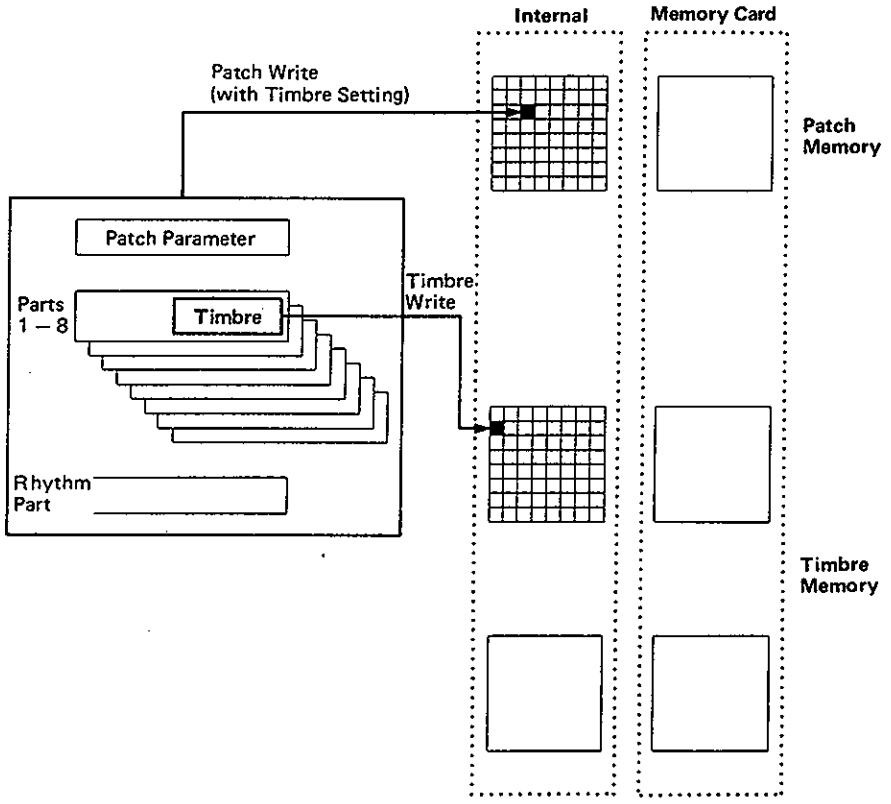
A patch consists of Patch Parameters;



A Patch involves the contents of the Timbre assigned to each Part, but not number assignment. Therefore, if a different Timbre is selected with the Timbre Select parameter or Program Change messages, the data itself will be copied from the Timbre.

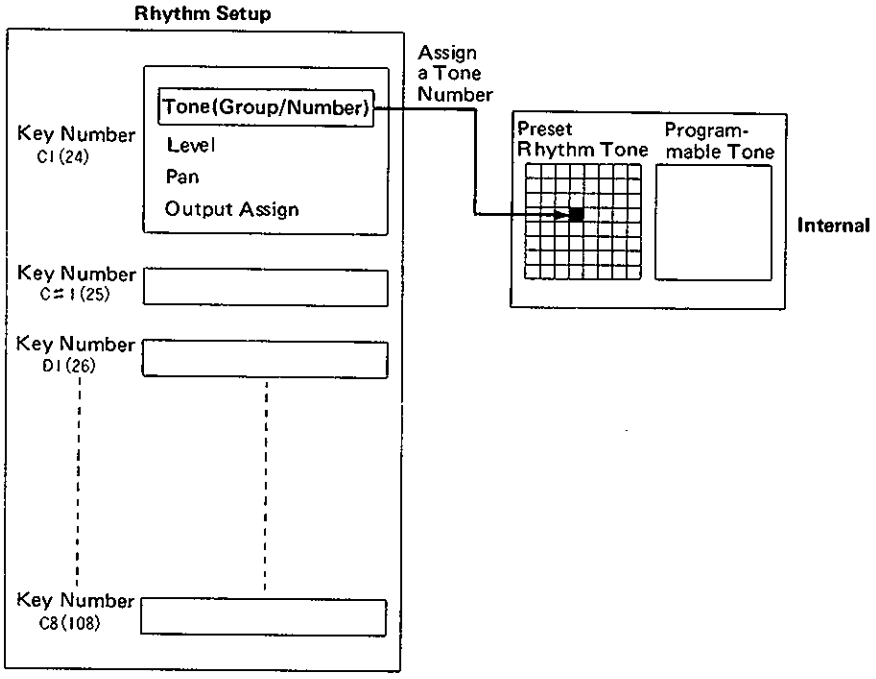



Therefore, the Patch Writing procedure can write the Timbre you have edited in a Patch, but not into a Timbre memory. To write it into a Timbre memory, you must take the Timbre Writing procedure.



- **Rhythm Setup**

Each Key Number (24 – 108) of the Rhythm Part has parameters of Tone Select, Level, Pan and Output Assign. Each Key Number can use any of the 63 Preset Rhythm Tones or the user's programmable 64 Tones. Tone Numbers are written in the Rhythm Setup.




- **System Setup**

This consists of the Master Tune, Memory Protect, Control Channel, Exclusive Unit Number and Overflow Assign Switch parameters.

# 2 PATCH EDITING

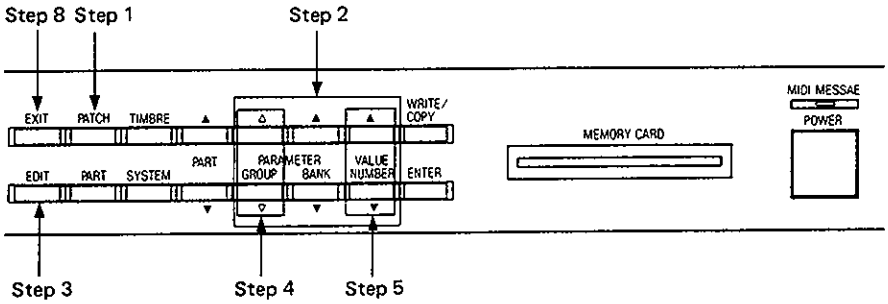
Patch editing includes Patch name and Reverb settings.

Parameters for Patch Edit

| Display | Parameter |
|---|---|
| Name | Patch Name |
| Reverb Type | Reverb Type |
| Reverb Time | Reverb Time |
| Reverb Level | Reverb Level |

* The editing procedure does not automatically rewrite the exiting data. The edited version will be erased by selecting a different Patch. If you wish to retain the data, take an appropriate Patch Writing procedure. (See page 71.)

## 1. Editing Procedure




Step 1 Push PATCH.

Step 2 Select the Patch to be edited with PARAMETER/GROUP (△▽), PARAMETER/BANK (▲▼) and VALUE/NUMBER (▲▼).

Step 3 Push EDIT.

Step 4 Select the parameter to be changed with PARAMETER/GROUP (△▽).

Step 5 Set the value of the parameter with VALUE/NUMBER (▲▼).

Step 6 Repeat Steps 4 and 5.

Step 7 If you wish to write your edited version, take the Patch Writing procedure (on page 71).

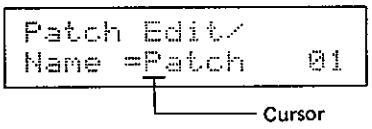
Step 8 When finished, push EXIT twice to return to the Play mode.

* Pushing EXIT once will retrieve the Patch Select Display.

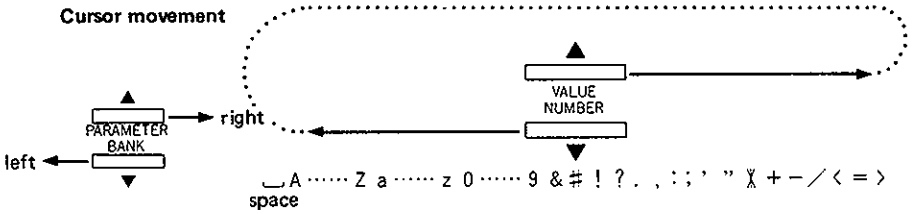
# 2. Patch Parameters

- **Patch Name**

A Patch can be named using 10 letters. Call the Patch Name Display, and the Patch Name currently selected appears with the cursor under the first letter.



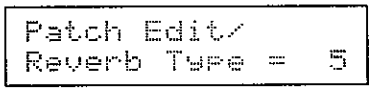

Move the cursor to the desired position with PARAMETER/BANK (▲▼), then rewrite the letter with VALUE/NUMBER (▲▼). The available letters for a Patch Name are shown below.




2

- **Reverb Type**

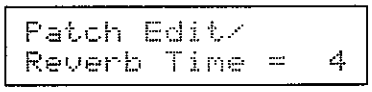
This selects one of the basic Reverb Types shown below.




| Number | Reverb Type |
|---|---|
| 1 | Small Room |
| 2 | Medium Room |
| 3 | Medium Hall |
| 4 | Large Hall |
| 5 | Plate |
| 6 | Delay 1 |
| 7 | Delay 2 |
| 8 | Delay 3 |
| OFF | No Reverb |

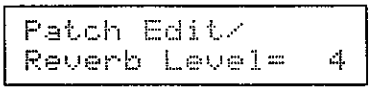
- **Reverb Time**

This sets the reverberation time. 1 to 8 are valid, higher values making longer reverb times.




- **Reverb Level**

This sets the level of reverb sound. 0 to 7 are valid, higher values increasing the level.



# 3 TIMBRE EDITING

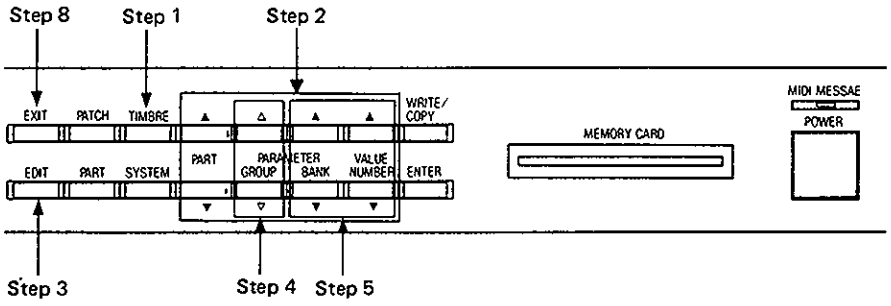
The Timbre editing procedure sets Tones to be assigned to a Timbre, the Bender Range, Output Assign, etc.

Parameters for Timbre Edit

| Display | Parameter |
|---|---|
| Tone | Tone (Group/Number) |
| Key Shift | Key Shift |
| Fine Tune | Fine Tune |
| Bender Range | Bender Range |
| Assign Mode | Assign Mode |
| Output Assign | Output Assign |

* The edited data will be erased by selecting a different Patch or Timbre. To retain it in memory, take the Patch Writing or Timbre Writing procedure. (See page 71, 73)

## 1. Timbre Editing Procedure




Step 1 Push TIMBRE.

Step 2 Call the Timbre to be edited.

To edit a Timbre currently assigned to a Part, select that Part using PART ( ▲▼ ). To edit a Timbre which is not assigned to any Part, use any Part.

Step 3 Push EDIT.

Step 4 Select the parameter you wish to edit with PARAMETER/GROUP ( ▽△ ).

Step 5 Change the value with PARAMETER/BANK ( ▲▼ ) and VALUE/NUMBER ( ▲▼ ).

* Pushing PARAMETER/BANK ( ▲▼ ) changes the number in steps of 10.

Step 6 Repeat Steps 4 and 5.

Step 7 To write you edited version, take the Timbre Writing or Patch Writing procedure.

Step 8 When finished, push EDIT twice to return to the Play mode.

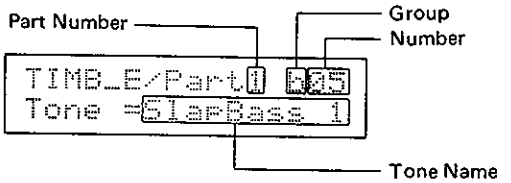
* Pushing EXIT once will retrieve the Timbre Select Display.

## 2. Timbre Parameters



- **Tone Select**

This select Tones to be assigned to a Timbre. A Tone is represented with a Group, and Number. Assign a Group with PARAMETER/BANK (▲▼), and assign a Number with VALUE/NUMBER (▲▼).
Depending on the type of Timbre which is being edited now, the available Tones differ as shown below.

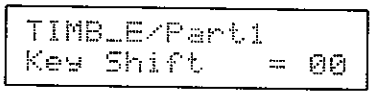


| | Internal Timbres | | Memory Cord Timbres |
|---|---|---|---|
| r | Preset Rhythm Tones | r | Preset Rhythm Tones |
| i | Programmable Tones | c | Memory Card Tones |
| b | Preset Tones b | b | Preset Tones b |
| a | Preset Tones a | a | Preset Tones a |

* Preset Rhythm Tones are 01 – 63 and OFF.
At OFF, no sound is produced.

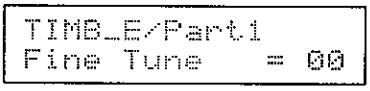
- **Key Shift**

The pitch of the Tone can be set from -24 to +24 (±2 octaves) in semi-tone steps.




- **Fine Tune**

The pitch of a Tone can be finely changed from -50 to +50 (±50 cents).




- **Bender Range**

This sets the variable range of the pitch change caused by moving the Bender Lever right and left, from 0 to 24 (2 octaves) in semi-tone steps.

- **Assign Mode**

Assign Mode refers to how each Tone should be played by the Key messages received.

```
TIMB_E/Part1
Assign Mode =  1
```

1: Single Assign – Played with Last Note Priority
2: Single Assign – Played with First Note Priority
3: Multi Assign – Played with Last Note Priority
4: Multi Assign – Played with First Note Priority

[Single Assign and Multi Assign]

- SINGLE ASSIGN
  In this mode, when more than one Key ON message is received by the same Key Number on the same MIDI channel, the sound of that key is muted once, then played again.
- MULTI ASSIGN
  In this mode, when more than one Key ON message is received by the same Key Number on the same MIDI channel, the two sounds are mixed.

[Last Note Priority and First Note Priority]

- LAST NOTE PRIORITY
  In this mode, when the D-110 has received more Key ON message than the maximum of voices, the earlier messages are replaced by the later ones.
- FIRST NOTE PRIORITY
  In this mode, when the D-110 receives more Key ON messages than the maximum of voices, the later messages are ignored, retaining the currently playing sounds.

- **Output Assign**

This sets the Output Socket through which each Timber sound (output of each Part) should be sent. By using the Multi Output Sockets, it is possible to add effects to particular Timbres, or to achieve a higher grade of mixing using an external mixer.

```
TIMB_E/Part1
OutputAssign=MIX
```

* When the Reverb Type in Patch Parameters is set to other than OFF, Multi Outputs 5 and 6 cannot be used. (You can set the parameter, but the signal is not sent to the output.)

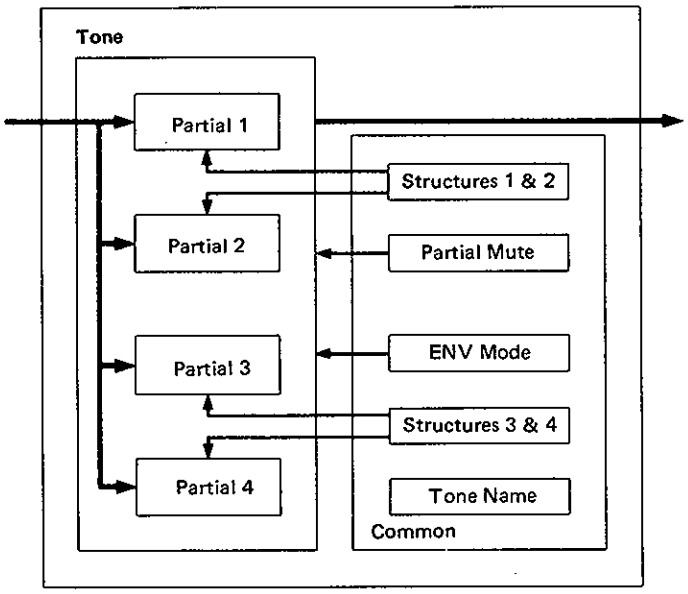
* The Timbres sent through the Direct Output Sockets do not take on reverb effects.

# 4 TONE EDITING

The general concept of synthesizers and sound synthesis are explained in "LA Synthesis" on page 90. Please read it together with this section.

## 1. The Basic Concept of a Tone

### [Partial and Structure]




A Tone consists of a PARTIAL block and a common block. The Partials are combined in pairs, and two sets of pairs form a Tone. An important COMMON Parameter called "Structure" decides how two of the four Partials should be combined or which sound generator is used, a synthesizer voice or a PCM voice.

### [Functions of the Structure]

**1) Selects a sound generator to be used for each Partial**

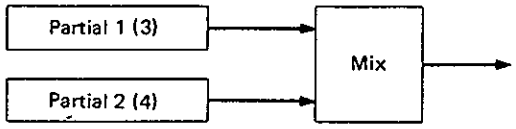
The Structure selects which of the two sound generators, a synthesizer sound generator or a PCM sound generator should be used for each Partial.

- **Synthesizer Sound Generator** — This synthesizer behaves like a conventional analog synthesizer.
- **PCM Sound Generator** — This behaves like a PCM sampled synthesizer.

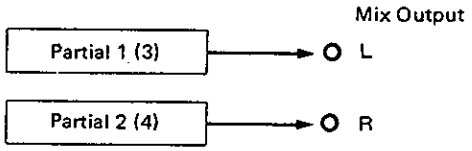
**2) Determines how to combine two Partials**

There are four different ways to combine Partials:

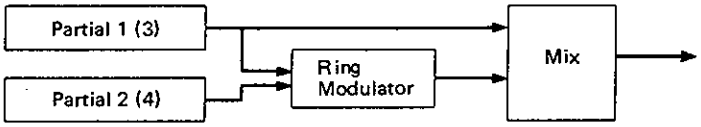
Mixing two Partials



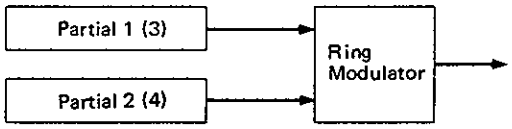

Sending two Partial sounds in stereo. However, if sending sounds through Multi Output Sockets or using this setting for Patches or via the monaural output, this will have exactly the same effect as above "Mixing two Partials".




Partial 1 (or 3) is mixed with the ring modulated sound of two Partials (including Partial 1 or 3).




Two Partials are ring-modulated and sent out.

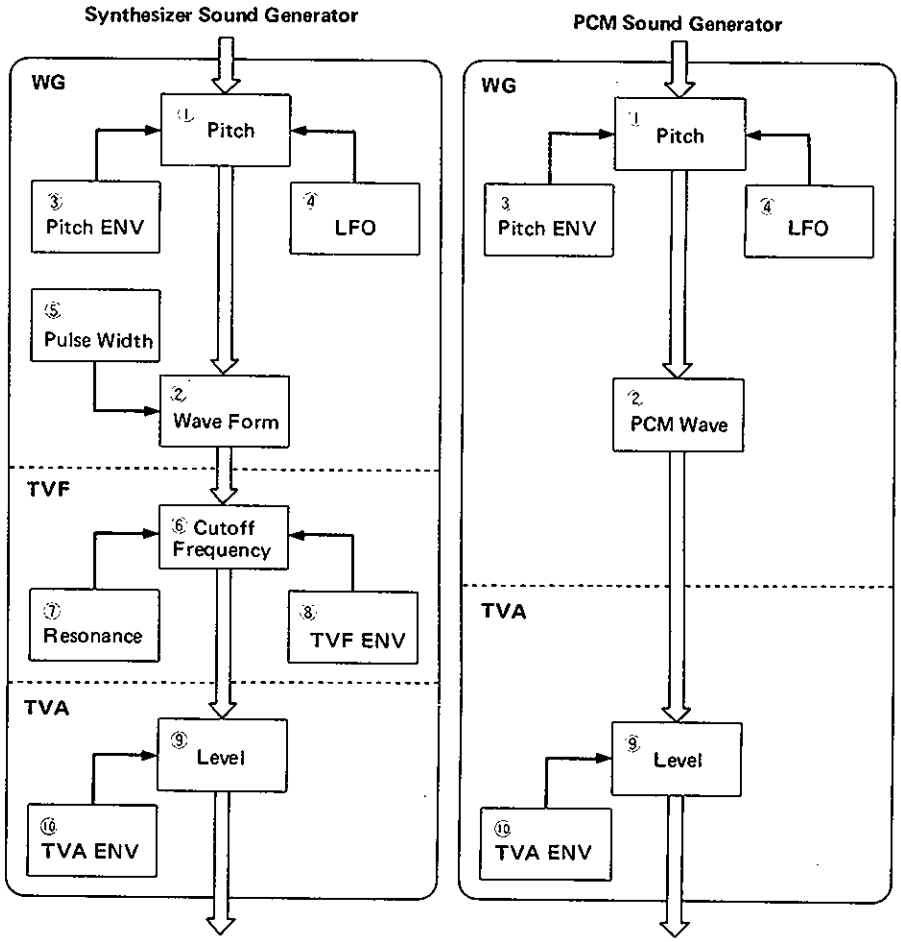



**[Ring Modulator]**

The Ring Modulator can be effectively used for creating metallic sounds, since it can increase harmonics by multiplying those of two Partials.

## [Partials]

Depending on which generators are selected in the Partial Block, greatly different parameters will be used. Some parameters used for the synthesizer sound generators are irrelevant to the PCM generator.
See the diagram below.




### • WG (Wave Generator)

In the WG (Wave Generator), the pitch and waveform are controlled.

① Pitch
The standard pitch of a Partial (sound generator) at C4 key ( = middle C) can be set here.

② Waveform/PCM Wave Number
This selects the waveform of the sound source.

③ Pitch ENV
This controls an envelope curve of the pitch changes caused by Key On/Off.

④ LFO (Low Frequency Oscillator)
LFO controls the vibrato.

⑤ Pulse Width
This changes the waveform of the sound source.

- **TVF (Time Variant Filter)**

This filter passes lower frequency harmonics and cuts off the higher ones. By changing the cutoff point and the resonance, the waveform changes.

⑥ Cutoff Frequency
This sets the cutoff point.

⑦ Resonance
This emphasizes the cutoff point, making more unusual or electronic sounds.

⑧ TVF ENV
This controls an envelope curve affecting the cutoff point changes caused by Key On/Off.

- **TVA (Time Variant Amplifier)**

This controls the volume of the Partial.

⑨ Level
This determines the volume of the sound.

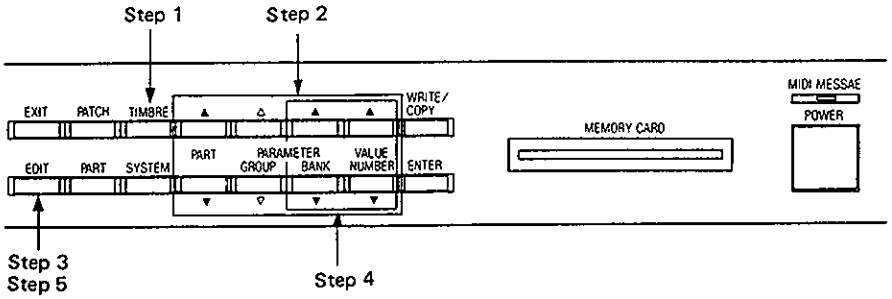
⑩ TVA ENV
This controls an envelope curve of the level changes caused by Key On/Off.

* When a Partial is using a PCM sound generator, the Pulse Width and the parameters in the TVF have no effect.

## 2. Editing Procedure

* The editing procedure does not automatically rewrite the existing Tone, and therefore will be erased by selecting a different Patch, Timber or Tone. To write the edited Tone in memory, take the Tone Writing procedure on page 75.

**[Selecting a Tone]**




Step 1 Push TIMBRE.

Step 2 Select the Timbre that contains the Tone to be edited.

To select a Timbre which is assigned to any Part, assign that Part with the Part Select Button. To select a Timbre which is not assigned to any Part, you can use any Part.

Step 3 Push EDIT.

This calls the Tone Select Display in Timbre Edit.

```
TIMB_E/Part1 b05
Tone =SlapBass 1
```

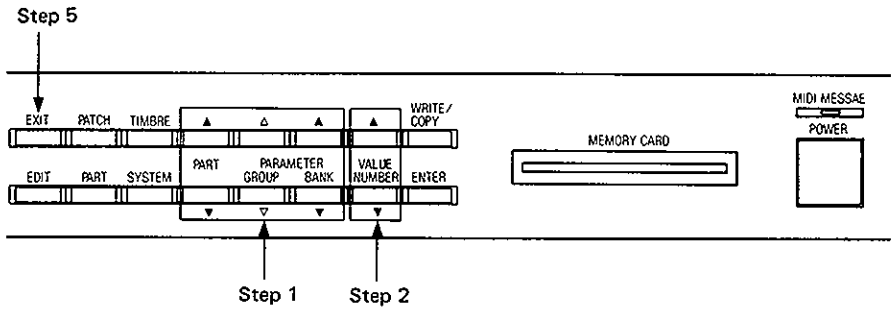
Step 4 Select the Tone to be edited with PARAMETER/BANK ( ▲▼ ) and VALUE/NUMBER ( ▲▼ ).

Step 5 Push EDIT.
This turns the unit to the Tone edit mode and selects the Tone Name Display.

```
Tone Edit/Common
Name =SlapBass 1
```

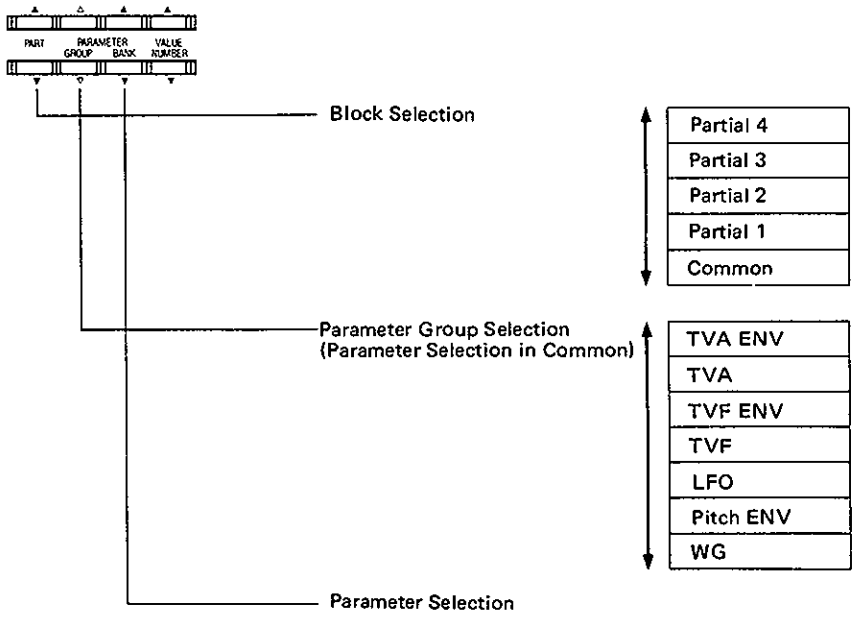
Go to the next section "Editing a Tone Parameter".

## [Editing a Tone Parameter]




Step 1 A Tone is represented with a Block (COMMON, PARTIALS 1 to 4) and a Group and a Parameter. First, select the Block with PART ( ▲▼ ), then the Group with PARAMETER/GROUP ( ▽△ ), then a Parameter with PARAMETER/BANK ( ▲▼ ).

* Common parameters have no Group division. So after selecting the Common Block, assign the Parameter Number with PARAMETER/GROUP ( ▽△ ).



Step 2 Change the value with VALUE/NUMBER ( ▲▼ ).

Step 3 Repeat Steps 1 and 2.

Step 4 If you wish to write the edited Tone, follow the Tone Writing procedure on page 75.

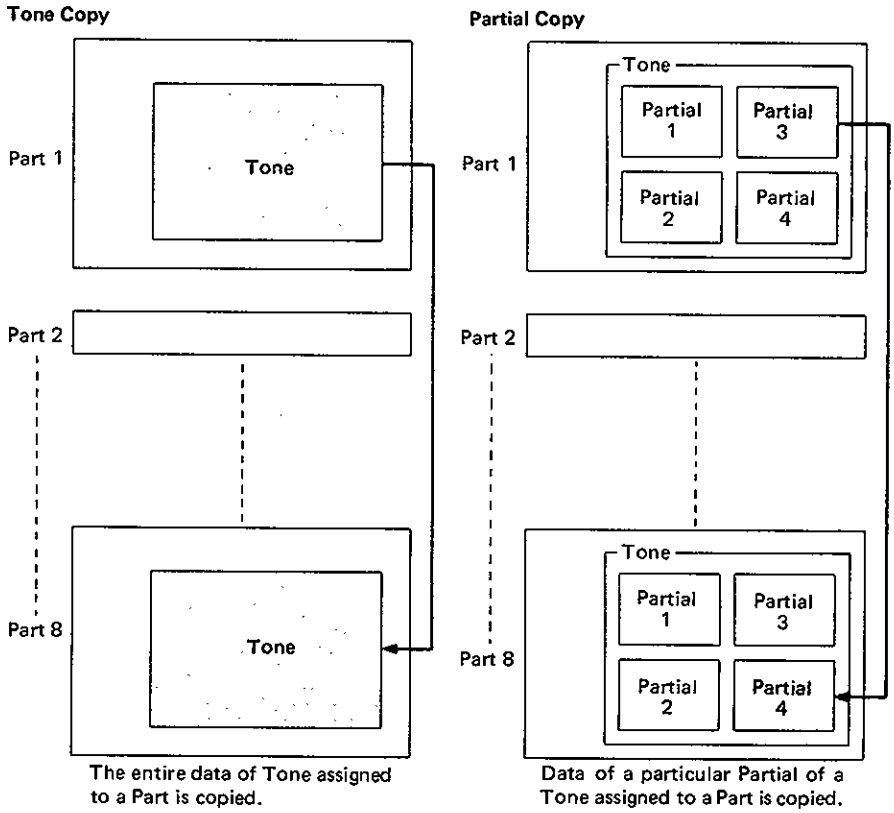
Step 5 When finished, push EXIT three times to return to the Play mode.

* Pushing EXIT twice will retrieve the Timbre Select Display.

| Block | Parameter Group | Parameter | Display |
|---|---|---|---|
| Common | Common Group | Tone Name | Name |
| | | Structures 1&2 | Structure 1&2 |
| | | Structures 3&4 | Structure 3&4 |
| | | Partial Mute | Partial Mute |
| | | ENV Mode | ENV Mode |
| Partials 1, 2, 3, 4 | WG Group | Pitch Coarse | WG Pitch Cors |
| | | Pitch Fine | WG Pitch Fine |
| | | Key Follow (Pitch) | WG Pitch KF |
| | | Bender Switch | WG Bender SW |
| | | Waveform | WG Waveform |
| | | PCM Wave Bank | PCM Bank |
| | | PCM Wave Number | PCM |
| | | Pulse Width | WG Puls Width |
| | | Velocity Sensitivity (Pulse Width) | WG PW Velo |
| | Pitch ENV Group | Pitch ENV Depth | P-ENV Depth |
| | | Velocity Sensitivity (Depth) | P-ENV Velo |
| | | Key Follow (Time) | P-ENV Time KF |
| | | Time 1/2/3/4 | P-ENV T1(..4) |
| | | Level 0/1/2 | P-ENV L0(..2) |
| | | Sustain Level | P-ENV Sus L |
| | | End Level | P-ENV End L |
| | LFO Group | Rate | P-LFO Rate |
| | | Depth | P-LFO Depth |
| | | Moduration Sensitivity | P-LFO Mod |
| | TVF Group | Frequency | TVF Freq |
| | | Resonance | TVF Reso |
| | | Key Follow (Frequency) | TVF Freq KF |
| | | Bias Point | TVF Bias P |
| | | Bias Level | TVF Bias Lvl |
| | TVF ENV Group | ENV Depth | TVF-ENV Dept |
| | | Velocity Sensitivity (Depth) | TVF-ENV Velo |
| | | Key Follow (Depth) | TVF-ENV DKF |
| | | Key Follow (Time) | TVF-ENV TKF |
| | | Time 1/2/3/4/5 | TVF-ENV T1(.5) |
| | | Level 1/2/3 | TVF-ENV L1(.3) |
| | | Sustain Level | TVF-ENV Sus L |
| | TVA Group | Level | TVA Level |
| | | Velocity Sensitivity | TVA Velocity |
| | | Bias Point 1/2 | TVA Bias P1(2) |
| | | Bias Level 1/2 | TVA Bias L1(2) |
| | TVA ENV Group | Key Follow (Time) | TVA-ENV TKF |
| | | Velocity Follow (Time 1) | TVA-ENV T1VF |
| | | Time 1/2/3/4/5 | TVA-ENV T1(.5) |
| | | Level 1/2/3 | TVA-ENV L1(.3) |
| | | Sustain Level | TVA-ENV Sus L |

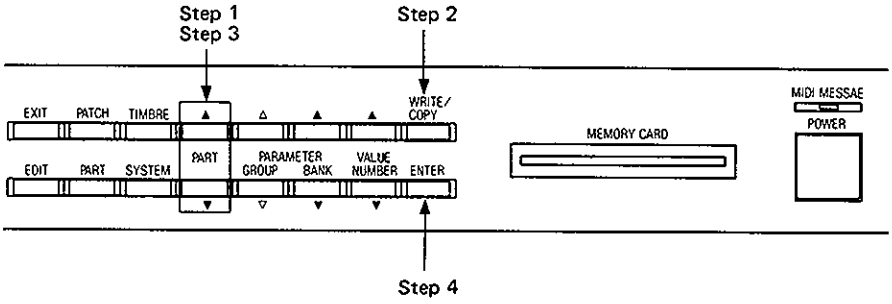
# 3. Copying a Tone or Partial

A Tone or Partial which is currently assigned to a Part (1 –8) can be copied, so that editing will be easier and quicker.




4

## [Tone Copy]

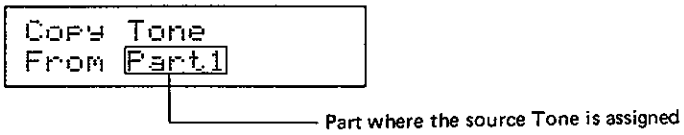



Step 1 With the unit turned to the Tone Edit mode, call the Common Display with PART ( ▲▼ ).

If the unit has not been in the Tone Edit mode, return to the Play mode, then enter the Tone Edit mode by pushing TIMBRE, EDIT, then EDIT.

Step 2 Push WRITE/COPY twice.

The Display responds with:

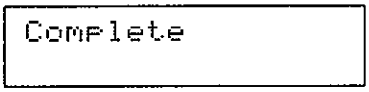



Step 3 Using PART ( ▲▼ ), call the Part where the source Tone is assigned.

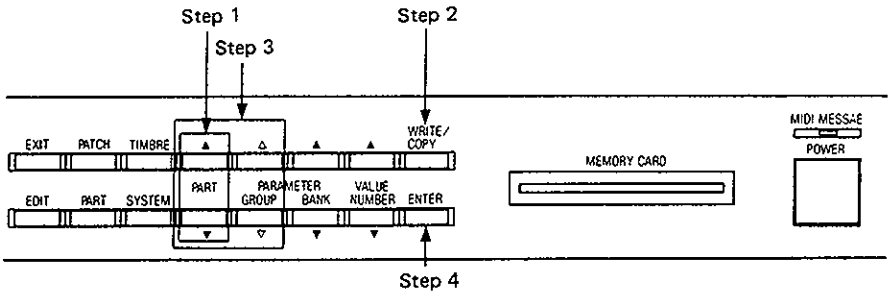
Step 4 Push ENTER.

* To leave this mode, push EXIT. The unit will return to the Tone Edit mode.

When copying is completed, the following will be shown for a while then the screen returns to the previous Display, before any copying procedure was taken.



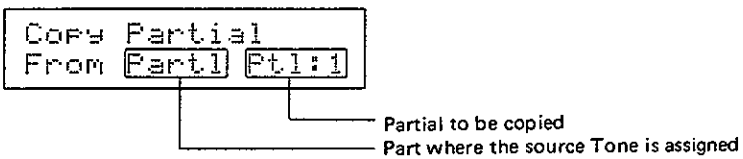

**[Partial Copy]**




Step 1 With the unit turned to the Tone Edit mode, call the destination Partial with PART ( ▲▼ ).
If the unit has not been in the Tone Edit mode, return to the Play mode, then enter the Tone Edit mode by pushing TIMBRE, EDIT, then EDIT.

Step 2 Push WRITE/COPY twice.

The Display responds with:

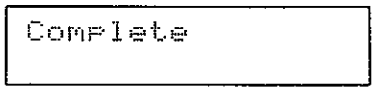



Step 3 Using PART ( ▲▼ ), call the Part where the source Tone is assigned, then call the Partial with PARAMETER/GROUP ( ▽△ ).

Step 4 Push ENTER.

* To leave this mode, push EXIT. The unit will return to the Tone Edit mode.

When copying is completed, the following will be shown for a while then the screen returns to the previous Display, before any copying procedure was taken.



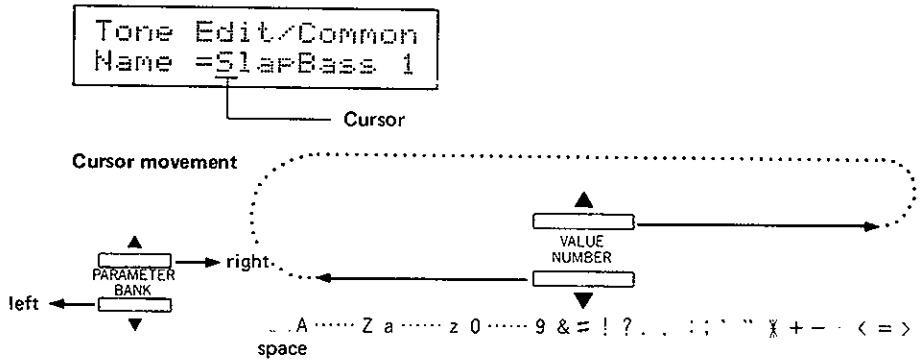

# 4. Tone Parameters

Some parameters included in a Partial that uses a PCM sound generator are invalid. The following mark is shown when the parameters apply even for PCM sounds. PCM

## [Common Parameters]

- **Tone Name** PCM

A Tone can be named using up to 10 letters. More the cursor to the letter to be changed with PARAMETER/BANK (▲▼), then change letters with VALUE NUMBER (▲▼). The available letters for naming are as shown below.



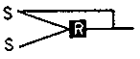
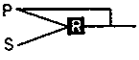
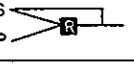
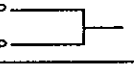
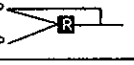
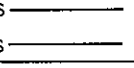
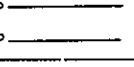
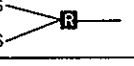
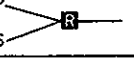
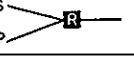
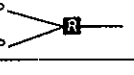
- **Structure 1 & 2/3 & 4** PCM

```
Tone Edit/Common
Structure 1&2=03
```

```
Tone Edit/Common
Structure 3&4=05
```

Select one of the following 13 Structures to be used for Structure 1, 2 or 3, 4.

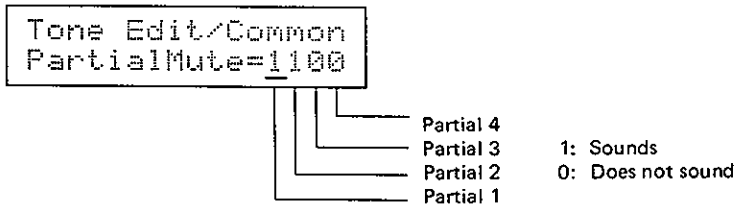
S = Synthesizer Sound Generator
P = PCM Sound Generator
R = Ring Modulator

| Structure Number | Partial 1 (3) | Partial 2 (4) | Partial Combination | Block Diagram |
|---|---|---|---|---|
| 1 | S | S | Mixture of Partial 1 (or 3) and Partial 2 (or 4). | |
| 2 | S | S | Mixture of Partial 1 (or 3) and ring-modulation. |  |
| 3 | P | S | Mixture of Partial 1 (or 3) and Partial 2 (or 4). | |
| 4 | P | S | Mixture of Partial 1 (or 3) and ring-modulation. |  |
| 5 | S | P | Mixture of Partial 1 (or 3) and ring-modulation. |  |
| 6 | P | P | Mixture of Partial 1 (or 3) and Partial 2 (or 4). |  |
| 7 | P | P | Mixture of Partial 1 (or 3) and ring-modulation. |  |
| 8 | S | S | Partial 1 (or 3) and Partial 2 (or 4) are output in stereo. |  |
| 9 | P | P | Partial 1 (or 3) and Partial 2 (or 4) are output in stereo. |  |
| 10 | S | S | Partial 1 (or 3) and Partial 2 (or 4) are ring-modulated then output. |  |
| 11 | P | S | Partial 1 (or 3) and Partial 2 (or 4) are ring-modulated then Output. |  |
| 12 | S | P | Partial 1 (or 3) and Partial 2 (or 4) are ring-modulated then output. |  |
| 13 | P | P | Partial 1 (or 3) and Partial 2 (or 4) are ring-modulated then output. |  |

* Structure 8 or 9 will output the sound of each Partial separately from the relevant Output Socket (this applies only to stereo output through the Mix Output Sockets).

- **Partial Mute** PCM

While editing a Partial parameter, any Partial sound can be muted, for you to listen to only the Partial you want. The Partial Mute, which is also one of the Tone parameters, can be written into memory.
Move the cursor with PARAMETER/BANK ( ▲▼ ) to select the Partial to be muted, then mute it with VALUE/NUMBER ( ▲▼ ). "1" means the partial will sound, and "0" is mute.

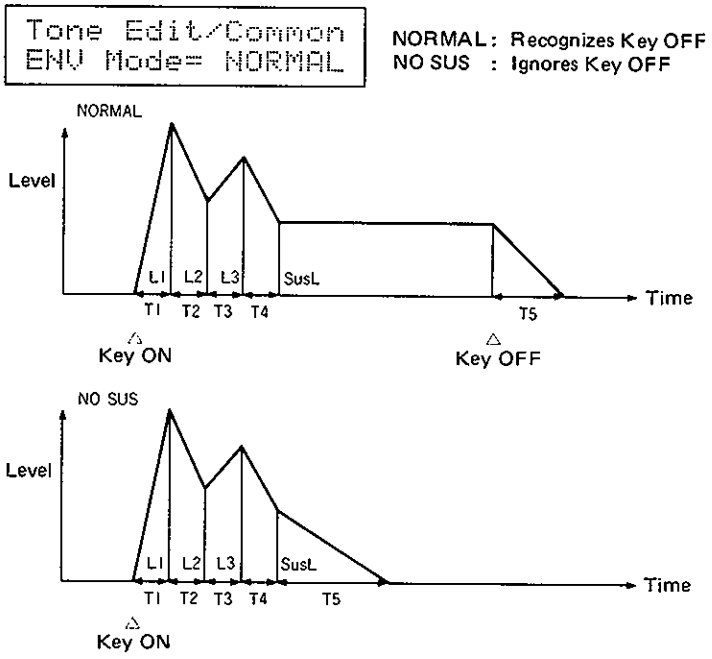



* Parameters of the Partial currently muted can be edited just the same.

* Partial Mute decreases the number of Partials which are to be used, and therefore increases the number of voices.

- **ENV Mode** PCM

This selects whether to receive or ignore the Key Off messages in the ENV of each Partial. Normally, this should be set to NORMAL, but set to NO SUSTAIN for programming a Rhythm Tone.




## [WG Group]

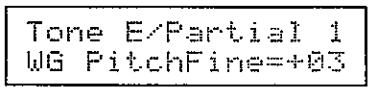
- **Pitch Coarse** PCM

This sets the standard pitch of a Partial in semi-tone steps from C1 to C9.

* The standard pitch is the pitch played by receiving C4 (middle C) key messages.

- **Pitch Fine** PCM

The standard pitch can be altered over about ±50 cents from –50 to +50.



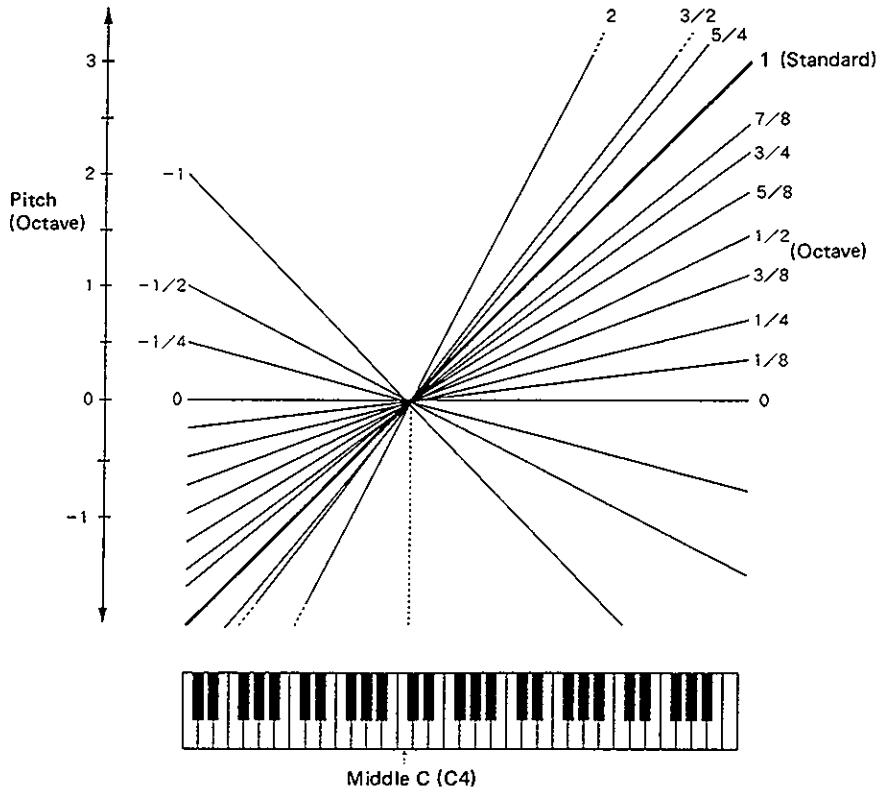

* When either of the Partial sound is muted while using the Ring Modulator, the other Partial sound is output directly (without the Ring Modulator).

- **Key Follow (Pitch)** PCM

This parameter can change the pitch ratio in semi-tone steps, corresponding to the chromatic scale used in conventional electronic musical instrument (e.g. synthesizer).

```
Tone E/Partial 1
WG Pitch KF=  s2
```

A value represents how many octaves are changed over 12 keys.




* s1 or s2 may be selected for slightly stretching octaves.

s1: Pitch 1 cent higher than one octave.
s2: Pitch 5 cents higher than one octave.

- **Bender Switch** PCM

This selects whether to control the pitch by the bender lever (ON) or not (OFF).

```
Tone E/Partial 1
WG Bender SW= ON
```

- **Waveform**

This selects a waveform of the synthesizer sound generator.

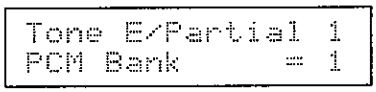
```
Tone E/Partial 1
WG Waveform =SQU
```

| Display | Waveform |
|---|---|
| SQU (Square) | |
| SAW (Sawtooth) | |

* A sawtooth waveform is produced by processing a square waveform at the TVF, consequently, even a sawtooth waveform can be controlled with the Pulse Width.

- **PCM Wave Bank/Number** PCM

This selects one of the 256 different sampled waves (128 waves in each Bank 1 or 2) of the PCM sound generator. Each sample is named (PCM name) as shown in the following table.



[Bank 1]

| No. | PCM Name | Remarks |
|---|---|---|
| 001 | Bass Drum-1 | Rhythm Sound |
| 002 | Bass Drum-2 | |
| 003 | Bass Drum-3 | |
| 004 | Snare Drum-1 | |
| 005 | Snare Drum-2 | |
| 006 | Snare Drum-3 | |
| 007 | Snare Drum-4 | |
| 008 | Tom Tom-1 | |
| 009 | Tom Tom-2 | |
| 010 | High-Hat | |
| 011 | High-Hat (Loop) | |
| 012 | Crash Cymbal-1 | |
| 013 | Crash Cymbal-2 (Loop) | |
| 014 | Ride Cymbal-1 | |
| 015 | Ride Cymbal-2 (Loop) | |
| 016 | Cup | |
| 017 | China Cymbal-1 | |
| 018 | China Cymbal-2 (Loop) | |
| 019 | Rim Shot | |
| 020 | Hand Clap | |
| 021 | Mute High Conga | |
| 022 | Conga | |
| 023 | Bongo | |
| 024 | Cowbell | |
| 025 | Tambourine | |
| 026 | Agogo | |
| 027 | Claves | |
| 028 | Timbale High | |
| 029 | Timbale Low | |
| 030 | Cabasa | |
| 031 | Timpani Attack | Attack Sound |
| 032 | Timpani | |
| 033 | Acoustic Piano High | |
| 034 | Acoustic Piano Low | |
| 035 | Piano Forte Thump | |
| 036 | Organ Percussion | |
| 037 | Trumpet | |
| 038 | Lips | |
| 039 | Trombone | |
| 040 | Clarinet | |
| 041 | Flute High | |
| 042 | Flute Low | |
| 043 | Steamer | |
| 044 | Indian Flute | |
| 045 | Breath | |
| 046 | Vibraphone High | |
| 047 | Vibraphone Low | |
| 048 | Marimba | |
| 049 | Xylophone High | |
| 050 | Xylophone Low | |
| 051 | Kalimba | |
| 052 | Wind Bell | |
| 053 | Chime Bar | |
| 054 | Hammer | |
| 055 | Guiro | |
| 056 | Chink | |
| 057 | Nails | |
| 058 | Fretless Bass | |
| 059 | Pull Bass | |
| 060 | Slap Bass | |
| 061 | Thump Bass | |
| 062 | Acoustic Bass | |
| 063 | Electric Bass | |
| 064 | Gut Guitar | |

| No. | PCM Name | Remarks |
|---|---|---|
| 065 | Steel Guitar | |
| 066 | Dirty Guitar | |
| 067 | Pizzicato | |
| 068 | Harp | |
| 069 | Contrabass | |
| 070 | Cello | |
| 071 | Violin-1 | |
| 072 | Violin-2 | |
| 073 | Koto | |
| 074 | Drawbars (Loop) | Sustained Sound |
| 075 | High Organ (Loop) | |
| 076 | Low Organ (Loop) | |
| 077 | Trumpet (Loop) | |
| 078 | Trombone (Loop) | |
| 079 | Sax-1 (Loop) | |
| 080 | Sax-2 (Loop) | |
| 081 | Reed (Loop) | |
| 082 | Slap Bass (Loop) | |
| 083 | Acoustic Bass (Loop) | |
| 084 | Electric Bass-1 (Loop) | |
| 085 | Electric Bass-2 (Loop) | |
| 086 | Gut Guitar (Loop) | |
| 087 | Steel Guitar (Loop) | |
| 088 | Electric Guitar (Loop) | |
| 089 | Clav (Loop) | |
| 090 | Cello (Loop) | |
| 091 | Violin (Loop) | |
| 092 | Electric Piano-1 (Loop) | |
| 093 | Electric Piano-2 (Loop) | |
| 094 | Harpsichord-1 (Loop) | |
| 095 | Harpsichord-2 (Loop) | |
| 096 | Telephone Bell (Loop) | |
| 097 | Female Voice-1 (Loop) | |
| 098 | Female Voice-2 (Loop) | |
| 099 | Male Voice-1 (Loop) | |
| 100 | Male Voice-2 (Loop) | |
| 101 | Spectrum-1 (Loop) | |
| 012 | Spectrum-2 (Loop) | |
| 103 | Spectrum-3 (Loop) | |
| 104 | Spectrum-4 (Loop) | |
| 105 | Spectrum-5 (Loop) | |
| 106 | Spectrum-6 (Loop) | |
| 107 | Spectrum-7 (Loop) | |
| 108 | Spectrum-8 (Loop) | |
| 109 | Spectrum-9 (Loop) | |
| 110 | Spectrum-10 (Loop) | |
| 111 | Noise (Loop) | |
| 112 | Shot-1 | Decay Sound |
| 113 | Shot-2 | |
| 114 | Shot-3 | |
| 115 | Shot-4 | |
| 116 | Shot-5 | |
| 117 | Shot-6 | |
| 118 | Shot-7 | |
| 119 | Shot-8 | |
| 120 | Shot-9 | |
| 121 | Shot-10 | |
| 122 | Shot-11 | |
| 123 | Shot-12 | |
| 124 | Shot-13 | |
| 125 | Shot-14 | |
| 126 | Shot-15 | |
| 127 | Shot-16 | |
| 128 | Shot-17 | |

* When a "Shot" of 112 to 128 in Bank 1 is selected, noise may be heard.

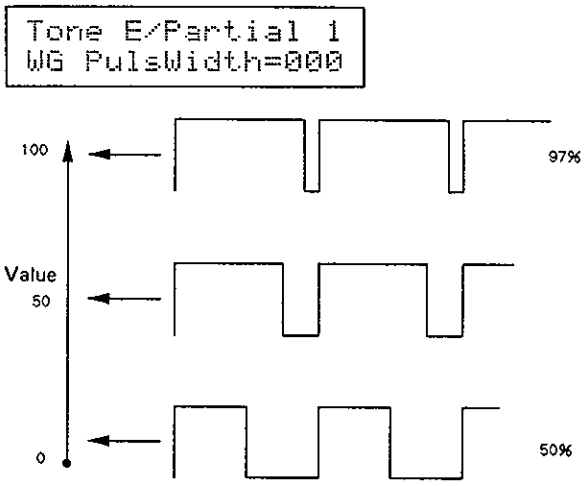
[Bank 2]

| No. | PCM Name | Remarks |
|---|---|---|
| 001 | Bass Drum-1* | Rhythm Sound (The pitch is not affected by Master Tuning.) |
| 002 | Bass Drum-2* | |
| 003 | Bass Drum-3* | |
| 004 | Snare Drum-1* | |
| 005 | Snare Drum-2* | |
| 006 | Snare Drum-3* | |
| 007 | Snare Drum-4* | |
| 008 | Tom Tom-1* | |
| 009 | Tom Tom-2* | |
| 010 | High-Hat* | |
| 011 | High-Hat* (Loop) | |
| 012 | Crash Cymbal-1* | |
| 013 | Crash Cymbal-2* Loop) | |
| 014 | Ride Cymbal-1* | |
| 015 | Ride Cymbal-2* (Loop) | |
| 016 | Cup* | |
| 017 | China Cymbal-1* | |
| 018 | China Cymbal-2* (Loop) | |
| 019 | Rim Shot* | |
| 020 | Hand Clap* | |
| 021 | Mute High Conga* | |
| 022 | Conga* | |
| 023 | Bongo* | |
| 024 | Cowbell* | |
| 025 | Tambourine* | |
| 026 | Agogo* | |
| 027 | Claves* | |
| 028 | Timbale High* | |
| 029 | Timbale Low* | |
| 030 | Cabasa* | |
| 031 | Loop-1 | Effect Sound (Repeats of the same sound) |
| 032 | Loop-2 | |
| 033 | Loop-3 | |
| 034 | Loop-4 | |
| 035 | Loop-5 | |
| 036 | Loop-6 | |
| 037 | Loop-7 | |
| 038 | Loop-8 | |
| 039 | Loop-9 | |
| 040 | Loop-10 | |
| 041 | Loop-11 | |
| 042 | Loop-12 | |
| 043 | Loop-13 | |
| 044 | Loop-14 | |
| 045 | Loop-15 | |
| 046 | Loop-16 | |
| 047 | Loop-17 | |
| 048 | Loop-18 | |
| 049 | Loop-19 | |
| 050 | Loop-20 | |
| 051 | Loop-21 | |
| 052 | Loop-22 | |
| 053 | Loop-23 | |
| 054 | Loop-24 | |
| 055 | Loop-25 | |
| 056 | Loop-26 | |
| 057 | Loop-27 | |
| 058 | Loop-28 | |
| 059 | Loop-29 | |
| 060 | Loop-30 | |
| 061 | Loop-31 | |
| 062 | Loop-32 | |
| 063 | Loop-33 | |
| 064 | Loop-34 | |

| No. | PCM Name | Remarks |
|---|---|---|
| 065 | Loop-35 | |
| 066 | Loop-36 | |
| 067 | Loop-37 | |
| 068 | Loop-38 | |
| 069 | Loop-39 | |
| 070 | Loop-40 | |
| 071 | Loop-41 | |
| 072 | Loop-42 | |
| 073 | Loop-43 | |
| 074 | Loop-44 | |
| 075 | Loop-45 | |
| 076 | Loop-46 | |
| 077 | Loop-47 | |
| 078 | Loop-48 | |
| 079 | Loop-49 | |
| 080 | Loop-50 | |
| 081 | Loop-51 | |
| 082 | Loop-52 | |
| 083 | Loop-53 | |
| 084 | Loop-54 | |
| 085 | Loop-55 | |
| 086 | Loop-56 | |
| 087 | Loop-57 | |
| 088 | Loop-58 | |
| 089 | Loop-59 | |
| 090 | Loop-60 | |
| 091 | Loop-61 | |
| 092 | Loop-62 | |
| 093 | Loop-63 | |
| 094 | Loop-64 | |
| 095 | Jam-1 (Loop) | Effect Sound (Repeats of combined sounds) |
| 096 | Jam-2 (Loop) | |
| 097 | Jam-3 (Loop) | |
| 098 | Jam-4 (Loop) | |
| 099 | Jam-5 (Loop) | |
| 100 | Jam-6 (Loop) | |
| 101 | Jam-7 (Loop) | |
| 102 | Jam-8 (Loop) | |
| 103 | Jam-9 (Loop) | |
| 104 | Jam-10 (Loop) | |
| 105 | Jam-11 (Loop) | |
| 106 | Jam-12 (Loop) | |
| 107 | Jam-13 (Loop) | |
| 108 | Jam-14 (Loop) | |
| 109 | Jam-15 (Loop) | |
| 110 | Jam-16 (Loop) | |
| 111 | Jam-17 (Loop) | |
| 112 | Jam-18 (Loop) | |
| 113 | Jam-19 (Loop) | |
| 114 | Jam-20 (Loop) | |
| 115 | Jam-21 (Loop) | |
| 116 | Jam-22 (Loop) | |
| 117 | Jam-23 (Loop) | |
| 118 | Jam-24 (Loop) | |
| 119 | Jam-25 (Loop) | |
| 120 | Jam-26 (Loop) | |
| 121 | Jam-27 (Loop) | |
| 122 | Jam-28 (Loop) | |
| 123 | Jam-29 (Loop) | |
| 124 | Jam-30 (Loop) | |
| 125 | Jam-31 (Loop) | |
| 126 | Jam-32 (Loop) | |
| 127 | Jam-33 (Loop) | |
| 128 | Jam-34 (Loop) | |

- **Pulse Width**

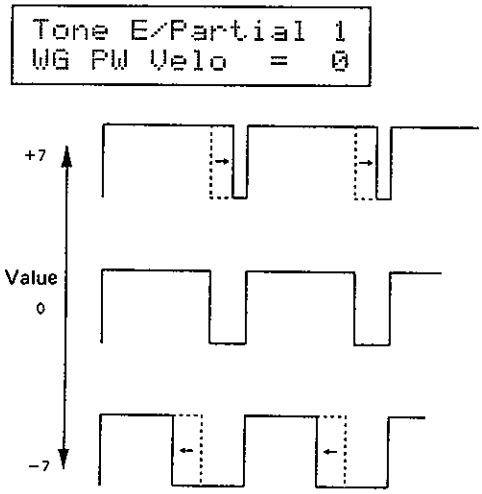
A square waveform has exactly the same width, up and down, but a Pulse Width waveform has different widths. The ratio of upper width to lower is called pulse width. 0 to 100 are valid for setting the pulse width. Depending on the set pulse width value, the pitch may alter by one octave.
The harmonic content of the sound changes greatly.




* When a sawtooth is selected with the WG Waveform parameter, a pulse width of 50% raises the pitch by an octave.

- **Pulse Width Velocity Sensitivity**

This sets the sensitivity of the velocity that controls the pulse width from –7 to +7. With "–" values, the pulse width becomes smaller by playing the keyboard harder, and with "+" values, the pulse width becomes wider by playing the keyboard harder.



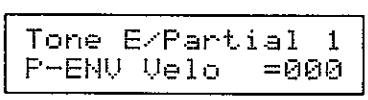

## [Pitch ENV Group]

- **Pitch ENV Depth** PCM

This sets the depth of the Pitch ENV from 1 to 10. Higher values deepen the effect.

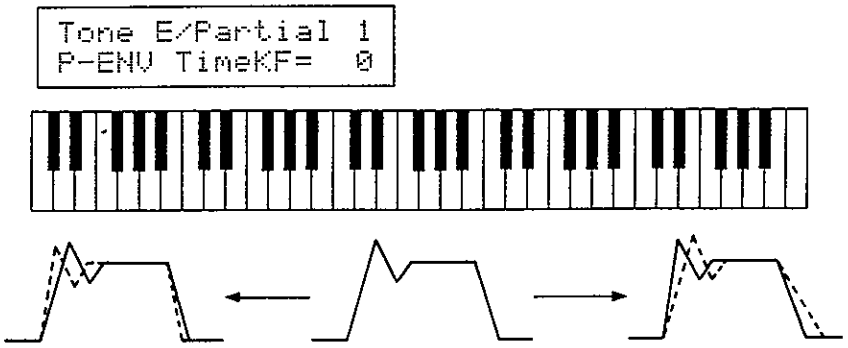
- **Pitch ENV Velocity Sensitivity** PCM

This sets the maximum effect of the velocity that controls the pitch of the Pitch ENV from 0 to 3. At higher values, the keyboard velocity has a greater effect on the envelope.



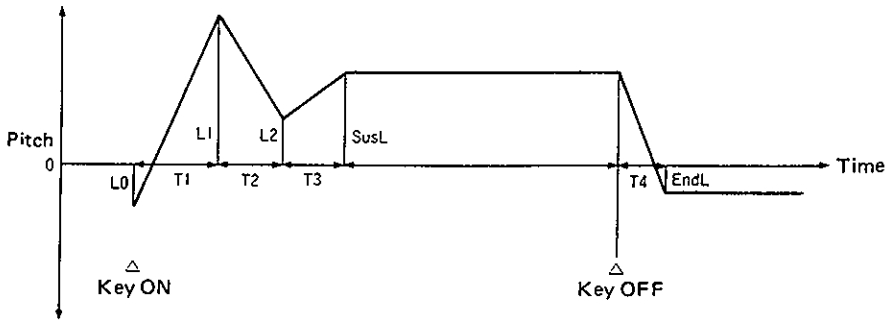
- **Pitch ENV Key Follow (Time)** PCM

This sets the time of the Pitch ENV depending on the key played, from 0 to 4.. Higher values change the time more drastically.



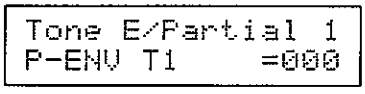

- **Pitch ENV/Level** PCM

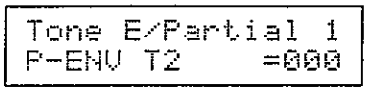
These parameters are the time needed for a pitch curve to move from one point to another, and the pitch level of a certain point.

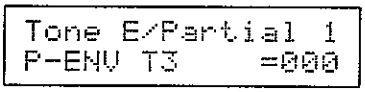


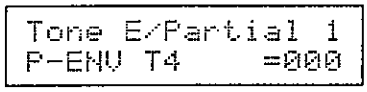

- **Time 1 / Time 2 / Time 3 / Time 4** PCM

This sets the time needed from one point to another, from 0 to 100.



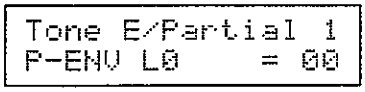



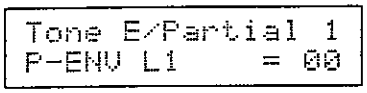



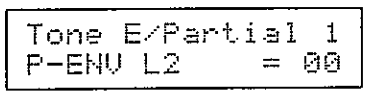



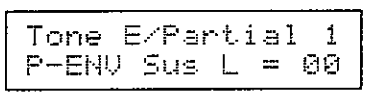

- **Level 0 / Level 1 / Level 2 / Sustain Level / End Level** PCM

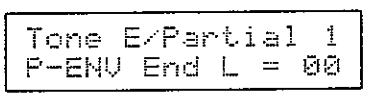
This sets the pitch of a certain point from –50 to +50.




* If the level of two adjacent points are set to similar values, the time between these two points may prove to be shorter than what is actually set, or even zero.

## [LFO Group]

- **LFO Rate** PCM

This sets the rate (frequency) of the LFO from 0 to 100. Higher values quicken the rate.

```
Tone E/Partial 1
P-LFO Rate  =000
```

- **LFO Depth** PCM

This sets the depth of the LFO from 0 to 100. Higher values deepen the effect.

```
Tone E/Partial 1
P-LFO Depth =000
```

* Vibrate effect can be obtained only from Point3 to key OFF of the Pitch ENV.

- **Modulation Sensitivity** PCM

This sets the sensitivity of the vibrato depth controlled by the modulation messages sent from the external controller unit. 0 to 100 are valid, higher values deepening the effect.

```
Tone E/Partial 1
P-LFO Mod   =000
```

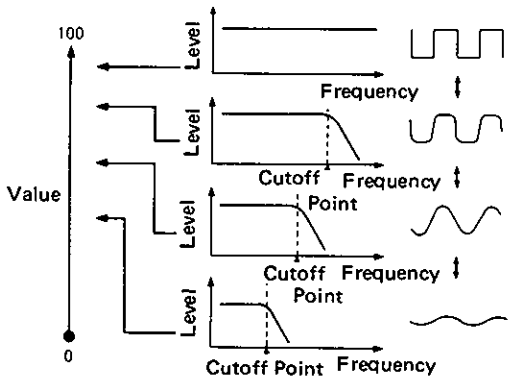
* Vibrate effect can be obtained only from Point3 to key OFF of the Pitch ENV.

## [TVF Group]

- **Cutoff Frequency**

This sets the cutoff point of the TVF from 0 to 100. As you lower the value, higher frequencies are removed and the waveform gradually becomes an approximation of a sine wave, then the sound will finally fade out.

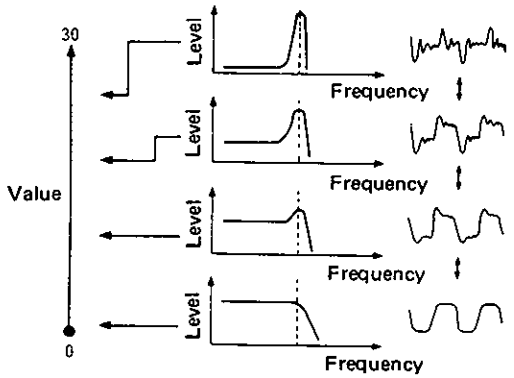
```
Tone E/Partial 1
TVF Freq    =000
```




- **Resonance**

This boosts the cutoff point from 0 to 30. As you increase the value, specific harmonics are emphasized and the sound will become more unusual, more electronic in nature.

```
Tone E/Partial 1
TVF Reso    = 00
```

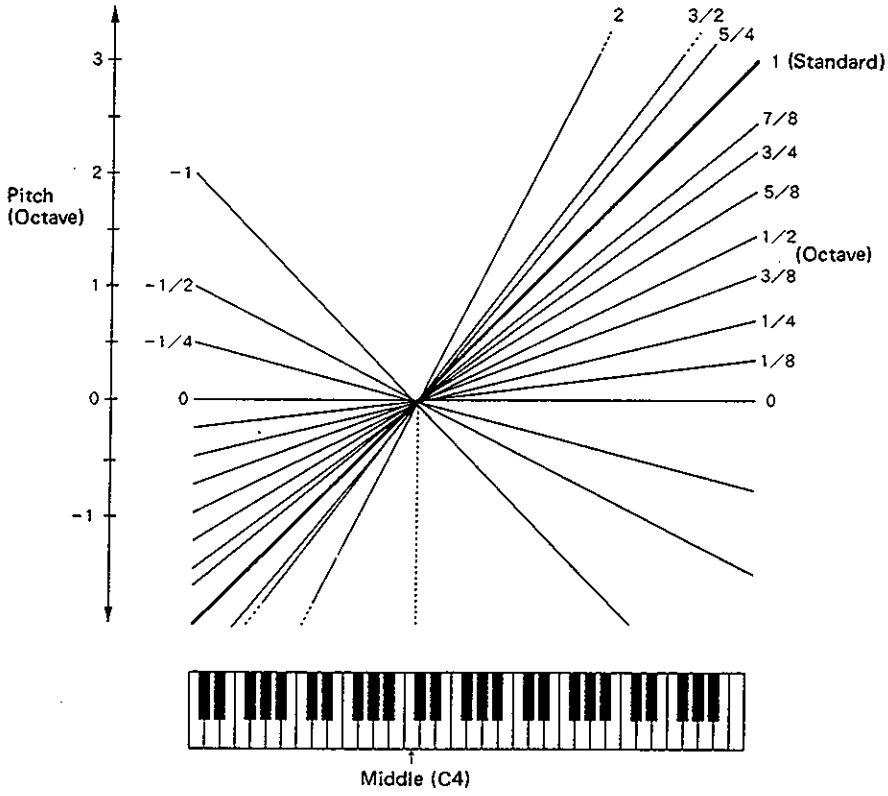


- **Key Follow (Frequency)**

This can change the cutoff point depending on the key played.

```
Tone E/Partial 1
TVF Freq KF=   0
```

Just like the Key Follow of WG Pitch, the value represents how many octaves change over 12 keys.




- **Bias Point/Level**

You can add a further change ( = bias level) to the Key Follow curve from any point (key).

- **Bias Point**

This sets the range (point and direction) where the bias level is valid, from <A1 to <C7 and from >A1 to >C7 in semi-tone steps.

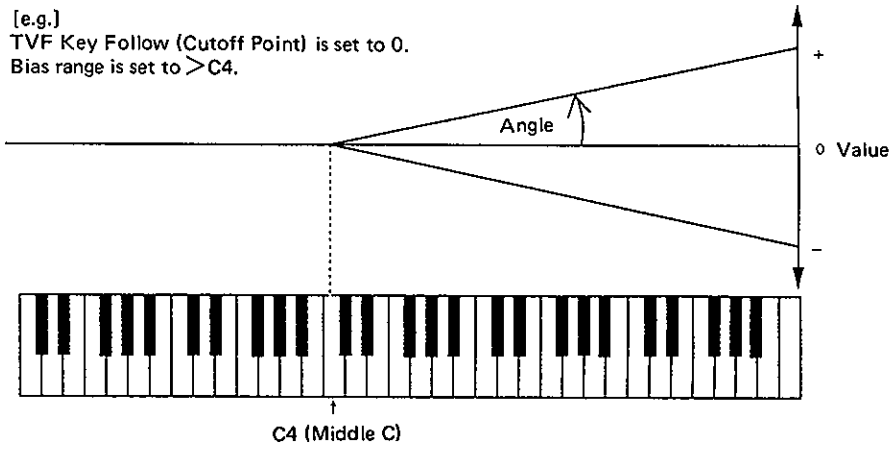
```
Tone E/Partial 1
TVF Bias P =< A1
```

[e.g.] >C4: The bias level is valid on the keyboard above the C4 key.
<C4: The bias level is valid on the keyboard below the C4 key.

- **Bias Level**

This bias level can be set from -7 to +7. "+" values raise the curve, and "–" values lower the curve.

```
Tone E/Partial 1
TVF Bias Lvl=  0
```




* The curve shown in the picture represents the Key Follow value with the bias level added.

## [TVF ENV Group]

- **ENV Depth**

This sets the depth of the TVF ENV modulation that changes the TVF Cutoff point. 0 to 100 are valid. At higher values, the effect is deeper.

```
Tone E/Partial 1
TVF-ENV Dept=000
```

- **ENV Velocity Sensitivity**

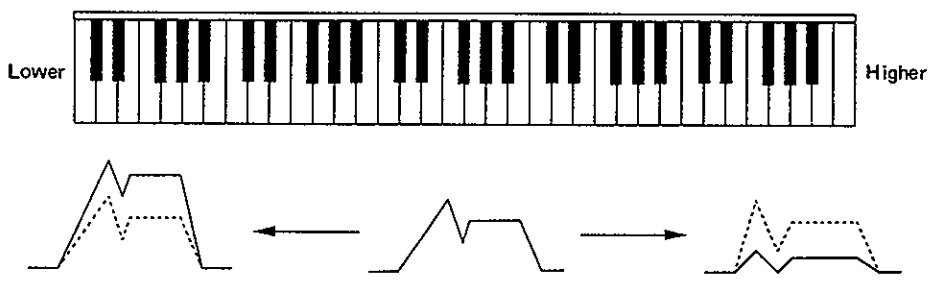
This sets the sensitivity of the velocity that controls the depth of the TVF ENV. 0 to 100 are valid. At higher values, the effect is deeper by playing the keyboard harder.

```
Tone E/Partial 1
TVF-ENV Velo=000
```

- **Key Follow (Depth)**

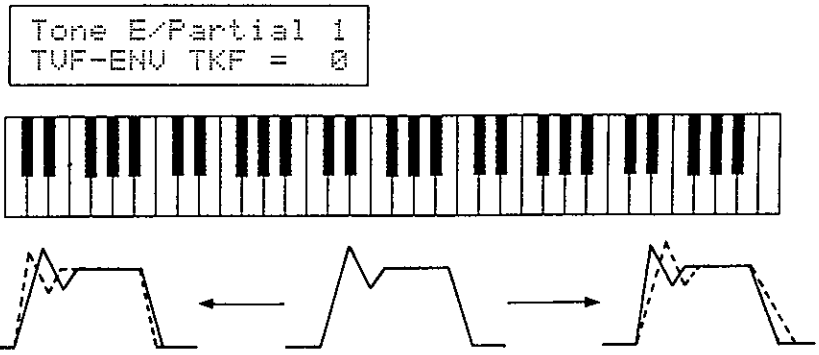
This can change the TVF ENV depth depending on the key played. 0 to 4 are valid, higher values changing the depth more drastically.

```
Tone E/Partial 1
TVF-ENV DKF =  0
```



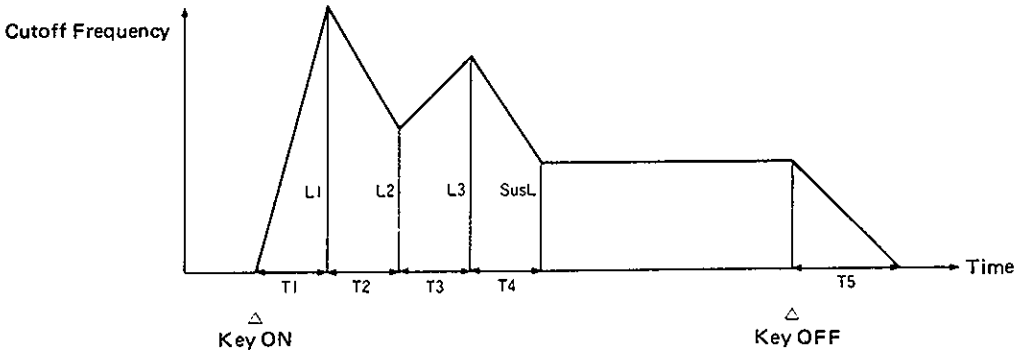
- **ENV Key Follow (Time)**

This can change the time of the TVF ENV depending on the key played. 0 to 4 are valid, higher values changing the time more drastically.



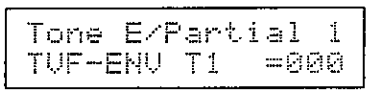

- **ENV Time/Level**

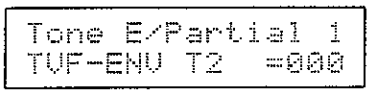
These parameters are the time needed for the envelope curve affecting the cutoff frequency to move from one point to another, and the level of the cutoff frequency at a certain point.

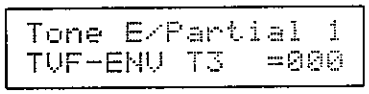


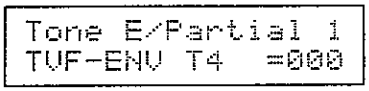

- **Time 1 / Time 2 / Time 3 / Time 4 / Time 5**

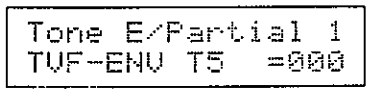
This sets the time needed from one point to another, from 0 to 100.



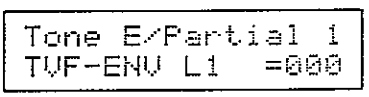



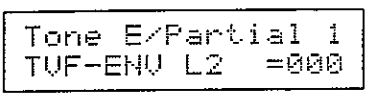



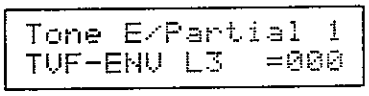



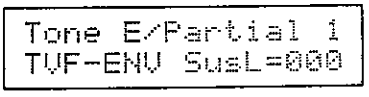

- **Level 1 / Level 2 / Level 3 / Sustain Level**

This sets the level of a certain point from 0 to 100.




* If the level of two adjacent points are set to similar values, the time between these two points may prove to be shorter than what is actually set, or even zero.

## [TVA Group]

- **Level** PCM

This sets the volume of a Partial from 0 to 100.

```
Tone E/Partial 1
TVA Level    =100
```

* Higher values may cause sound distortion. If so, lower the value.

* Even when this is set to zero here, the sound may not be completely muted if the TVA ENV curve is high.

- **Velocity Sensitivity** PCM

This sets the sensitivity of the velocity that controls the volume of the sound from –50 to +50. "–" values lower the level by harder playing, and "+" values raise the level by harder playing.

```
Tone E/Partial 1
TVA Velocity=+40
```

< Bias Point/Level >

You can add a further change ( = bias level) to the volume level from any point (key).

- **Bias Points 1 and 2** PCM

This sets the range (point and direction) where the bias level is valid at two positions (keys), from <A1 to <C7 and from >A1 to >C7 in semi-tone steps.

```
Tone E/Partial 1
TVA Bias P1=>C#3
```

```
Tone E/Partial 1
TVA Bias P2=>C#3
```

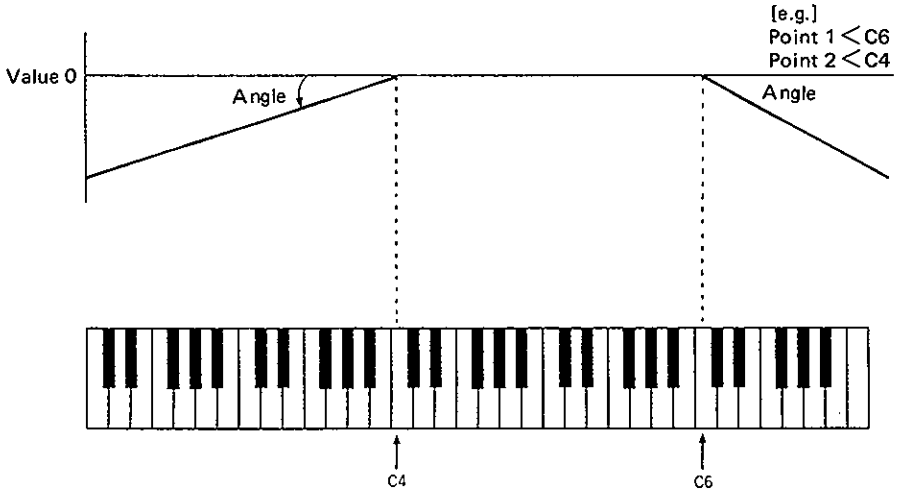
[e.g.] >C4: The bias level is valid on the keyboard above the C4 key.
<C4: The bias level is valid on the keyboard below the C4 key.

- **Bias Levels 1 and 2** PCM

This bias level can be set from 0 to –12. Lower values lower the curve.

```
Tone E/Partial 1
TVA Bias L1 = 00
```

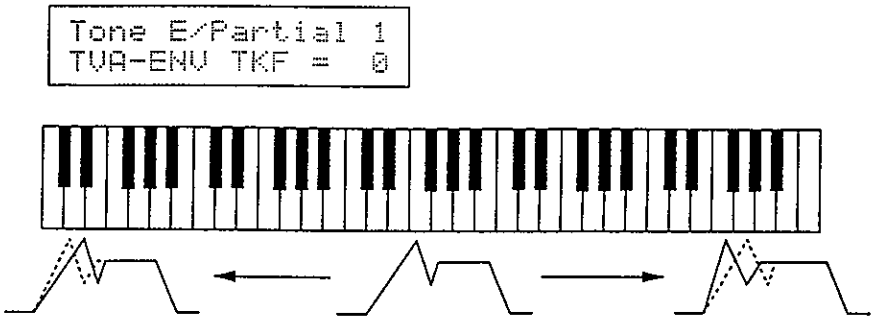
```
Tone E/Partial 1
TVA Bias L2 = 00
```



## [TVA ENV Group]

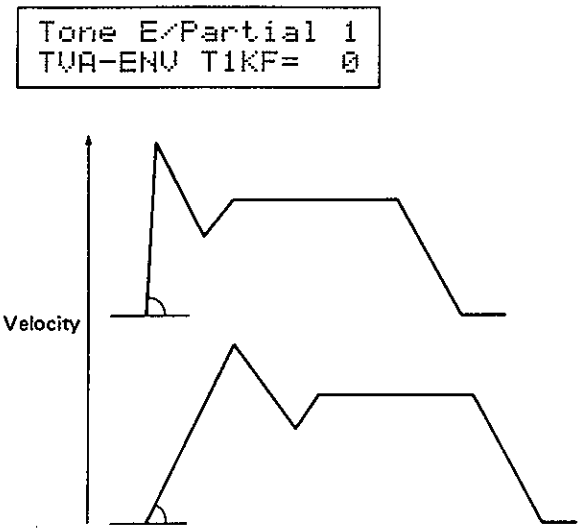
- **TVA ENV Key Follow (Time)** PCM

This sets the time of the TVA ENV depending on the key played, from 0 to 4. Higher values change the time more drastically.



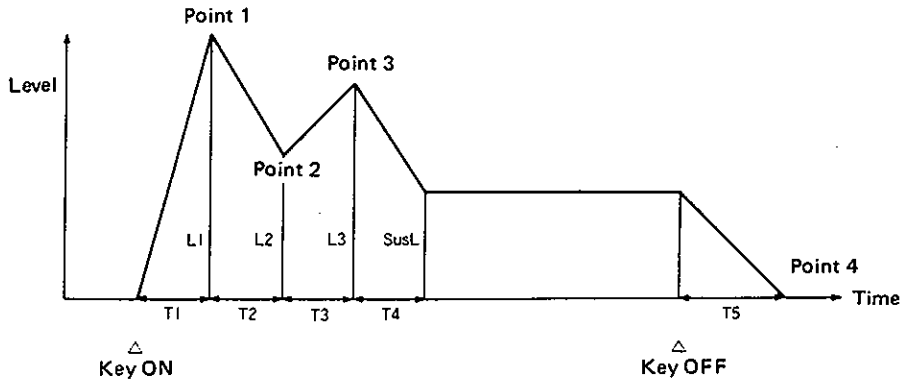

- **TVA ENV Velocity Follow (Time 1)** PCM

This sets the maximum effect of the velocity that controls the time of the TVA ENV from 0 to 4. At higher values, the Time 1 will be shortened by playing the keyboard harder.



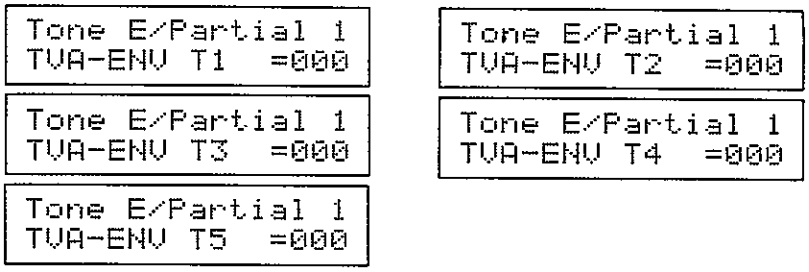

- **TVA ENV Time/Level** PCM

These parameters are the time needed for a volume curve to move from one point to another, and the volume of a certain point.



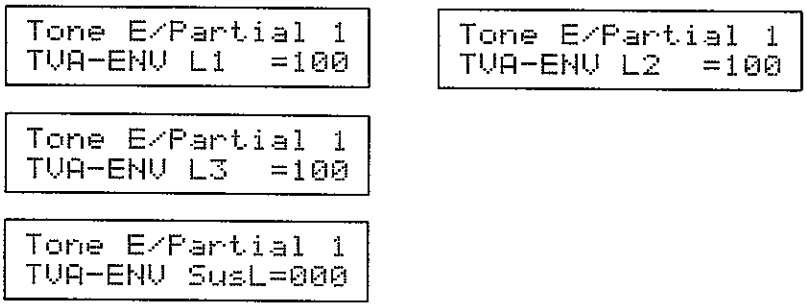
- **Time 1 / Time 2 / Time 3 / Time 4 / Time 5** PCM

This sets the time needed for the curve to move from one point to another, from 0 to 100.




- **Level 1 / Level 2 / Level 3 / Sustain Level** PCM

This sets the volume of a certain point from 0 to 100.




* If the level of two adjacent points are set to similar values, the time between these two points may prove to be shorter than what is actually set, or even zero.

# 5 PART SETTING

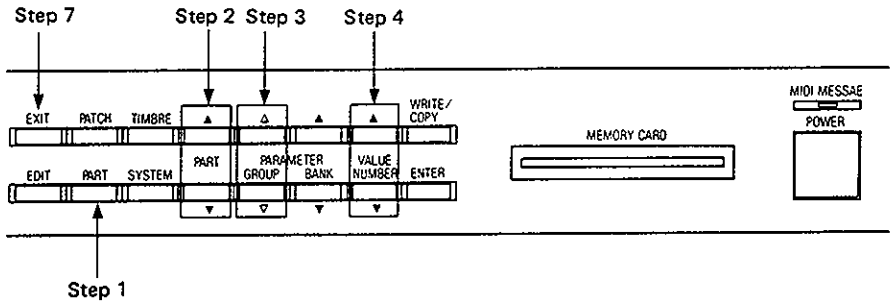
Part Setting involves editing the MIDI channel or volume in each PART.

Parameters for Part Setting

| Display | Parameter |
|---|---|
| Output Level | Output Level |
| Pan | Pan |
| Key Range(L) | Key Range (Lower Limit) |
| Key Range(U) | Key Range (Upper Limit) |
| MIDI Channel | MIDI Channel |
| Ptl Reserve | Partial Reserve |

* The Editing procedure does not rewrite the previous data, therefore the edited data will be erased by selecting a new Patch. To retain your edited version, take the Patch Writing procedure (see page 71.)

## 1. Editing Procedure




Step 1 Push PART.

Step 2 Using PART (▲▼), call the Part to be edited.

Step 3 Using PARAMETER/GROUP (▽△), select the parameter to be edited.

Step 4 Using VALUE/NUMBER (▲▼), change the value.

PARAMETER/BANK (▲▼) can be used to change values drastically.

Step 5 Repeat Steps 2, 3 and 4.

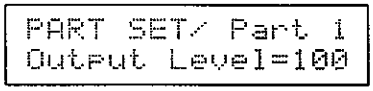
Step 6 To write the edited data, take the Patch Writing procedure (page 71).

Step 7 When finished, push EXIT to return to the Play mode.

# 2. Part Parameters

- **Output Level**

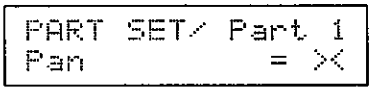
This sets the level of each Part (1 – 8 and Rhythm) from 0 to 100. Higher values increase the volume.

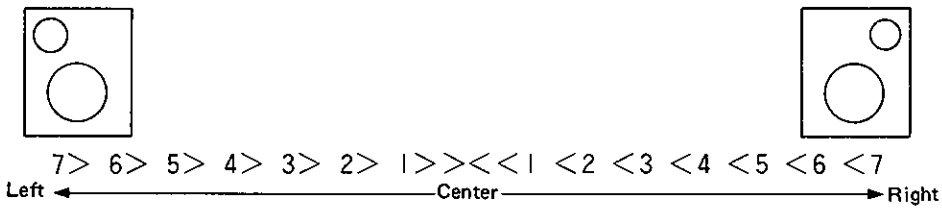



* The actual output is the level set here multiplied by the TVA Level (Tone parameter) in Tone Parameters, MIDI Volume and the Expression.

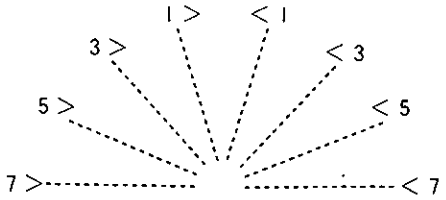
- **Pan**

Pan is positioning of the sound image output in stereo through the Mix Outputs. 7> to <7 are valid as shown below.




* When the Structure of monaural output is used, the actual changes of panning will be as shown below.




* When the Structure of the Tone used in that Part is 8 or 9, the actual sound imaging of each Partial will be as shown below.

| Value | Partial 1(3) | Partial 2(4) |
|---|---|---|
| <7 | <7 | <7 |
| <6 | <5 | <7 |
| <5 | <3 | <7 |
| <4 | <1 | <7 |
| <3 | 1> | <7 |
| <2 | 3> | <7 |
| <1 | 5> | <7 |
| >< | 7> | <7 |
| 1> | 7> | <5 |
| 2> | 7> | <3 |
| 3> | 7> | <1 |
| 4> | 7> | 1> |
| 5> | 7> | 3> |
| 6> | 7> | 5> |
| 7> | 7> | 7> |

* In the Rhythm Part, the Pan can be set individually for each Key Number, therefore, the overall Pan setting for the Part cannot be performed.

<Key Range>

This sets the key range which can receive Key messages. The Key Range, however, cannot be set for the Rhythm Part.

- **Lower Limit**

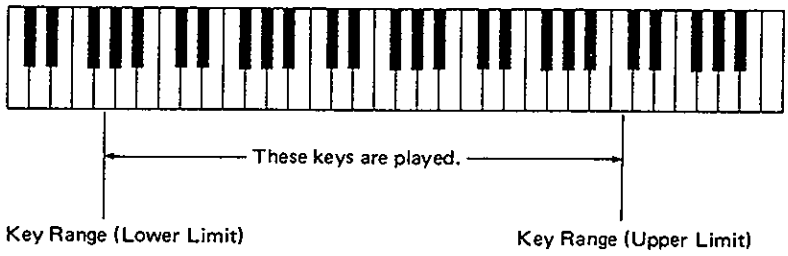
This sets the lowest key of the key range, from C1 to C9. The right side of the keyboard from the set key is valid.

```
PART SET/  Part1
KeyRange(L)= G2
```

- **Upper Limit**

This sets the highest key of the key range, from C1 to C9. The left side keyboard from the set key is valid.

```
PART SET/  Part1
KeyRange(U)= C7
```




* If you set the Lower Limit to the right of the Upper Limit, no key will sound over the entire keyboard range.

- **MIDI Channel**

The MIDI receive channel of each Part can be set from 1 to 16, or OFF.

```
PART SET/ Part 1
MIDI Channel= 02
```

* If the MIDI channel of a Part is set to OFF, the Part does not function.

- **Partial Reserve**

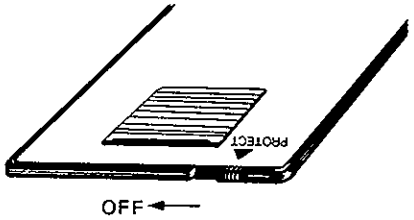
This sets the number of Partials which can be used for a certain Part prior to other Parts. Even when more key messages than reserved are sent, if there are Partials which are not used in other Parts, they will be put to work in that Part. If another part requires partials from this part, they may not be used if they have been reserved for this part.
The Partial Reserve can be set from 0 to 32 without the total number of Partials exceeding 32.

```
PART SET/ Part 1
Pt1 Reserve = 03
```

# 6 WRITING

Your edited version of Patch Parameters, Timber/Tone Parameters or Part Settings will be erased by selecting a different Patch.
If you wish to retain the edited parameters, you are required to write it into the internal memory or onto a memory card.

Before you write data onto a memory card, set the Protect Switch to the OFF position, then return to ON when finished.




## 1. Patch Writing

Patch Writing includes all the Patch Parameters, Timbre assignment for each Part and Part settings.

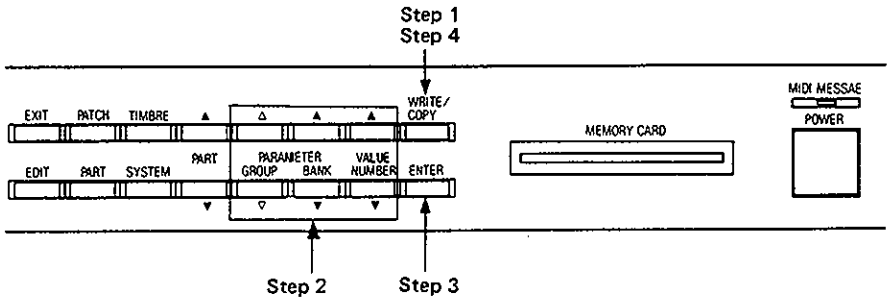
The Data which can be written by the Patch Writing procedure are:

Data Written by Patch Writing

| | Parameter | Mode |
|---|---|---|
| Patch | Patch Name<br>Reverb Type<br>Reverb Time<br>Reverb Level | Patch Edit |
| Part 1 – 8 | Output Level<br>Pan<br>Key Range (Lower Limit, Upper Limit)<br>MIDI Channel<br>Partial Reserve | Part Setting |
| | Tone (Group/Number)<br>Key Shift<br>Fine Tune<br>Bender Range<br>Assign Mode<br>Output Assign | Timbre Edit |
| Rhythm Part | Output Level<br>MIDI Channel<br>Partial Reserve | Part Setting |

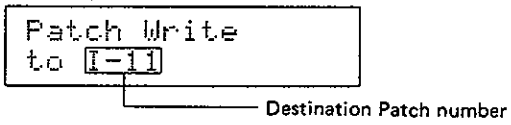
* If you use the Patch Writing procedure to write data in the internal memory (or on a memory card) onto a memory card (or into the internal memory), and if a Tone of i (or c) group is assigned to the Timbre, the contents of the sound is automatically changed.

## [Patch Writing Procedure]




Step 1 With the unit turned to the Patch Select or Patch Edit mode, push WRITE/COPY.

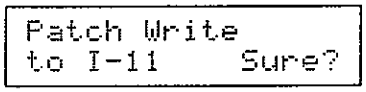
The Display responds with:




Step 2 Select a destination Patch Number (location for a new Patch). First select the internal or memory card mode with PARAMETER/GROUP (▽△), then a Bank with PARAMETER/BANK (▲▼), then a Number with VALUE/NUMBER (▲▼).

Step 3 Push ENTER.

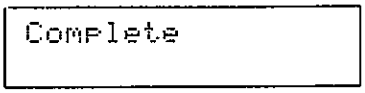
The Display responds with "Sure? ".




Step 4 Push WRITE/COPY to continue.

* To leave the mode, push EXIT, and the Display returns to the previous condition before any writing procedure was taken.

When the data is written properly, the Display responds as shown below for a while then returned to the previous condition.



When writing data into the internal memory, and the Memory Protect is set to ON, the following Display is shown. At this stage, you can carry on writing by pushing ENTER or leave the writing mode by pushing EXIT.

```
Memory Protected
Turn off once ?
```

When writing data onto a memory card, and the Memory Protect is set to ON, the following Display is shown for a while then the previous condition. Set the Protect Switch on the memory card to the OFF position, then repeat the above Patch Writing procedure.

```
Card Protected
```

* The Patch Data can not be written at C-51 to 88 onto the M-128D Memory card.

* If an error message is shown in the Display, resolve it by following the instructions in "Error Messages Table" on page 96.

## 2. Timbre Writing

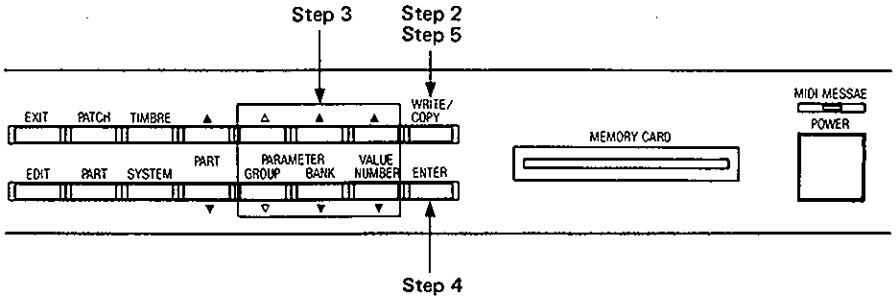
Timbre Writing includes all the Timbre Parameters.
The Data which can be written using the Timbre Writing procedure are:

Data Written by Timbre Writing

| Parameter | Mode |
|---|---|
| Tone (Group/Number)<br>Key Shift<br>Fine Tune<br>Bender Range<br>Assign Mode<br>Output Assign | Timbre Edit |

* If you use the Timbre Writing procedure to write data in the internal memory (or on a memory card) onto a memory card (or into the internal memory), and if a Tone of i (or c) group is assigned to the Timbre, it will be automatically changed to c (or i) group.

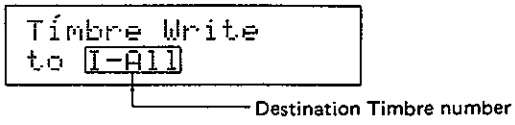
**[Timbre Writing Procedure]**



Step 1 Call the Patch or Part where the Timbre you wish to write is assigned.

Step 2 With the unit turned to the Timbre Select or Timbre Edit mode, push WRITE/COPY.

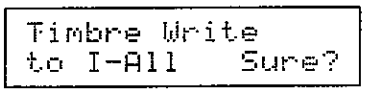
The Display responds with:




Step 3 Select a destination Timbre Number (location for a new Timbre). First select a Group with PARAMETER/GROUP ( ▽△ ), then a Bank with PARAMETER/BANK ( ▲▼ ), then a Number with VALUE/NUMBER ( ▲▼ ).

Step 4 Push ENTER.

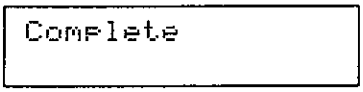
The Display responds with "Sure? "



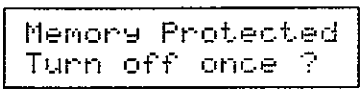

Step 5 Push WRITE/COPY to continue.

* To leave the mode, push EXIT, and the Display returns to the previous condition which is before any writing procedure was taken.

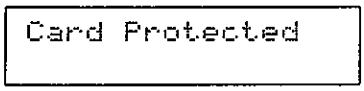
When the data is written properly, the Display responds as shown below for a while then returned to the previous condition.




When writing data into the internal memory, and the Memory Protect is set to ON, the following Display is shown. At this stage, you can carry on writing by pushing ENTER or leave the writing mode by pushing EXIT.




When writing data onto a memory card with the Memory Protect Switch set to the ON position, the following Display is shown for a while then the previous condition. Set the Protect Switch on the memory card to the OFF position, then repeat the procedure.




* If an error message is shown in the Display, resolve it by following the instructions in "Error Message Table" on page 96.

# 3. Tone Writing

Tone Writing includes all the Tone Parameters.

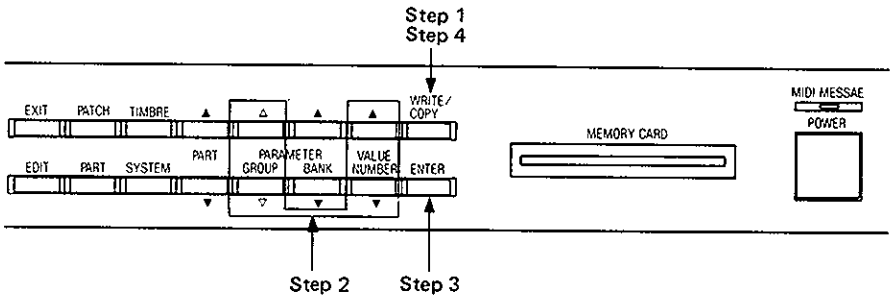
The Data which can be written by the Tone Writing procedure are:

Data Written by Tone Writing

| Parameter | Mode |
|---|---|
| All the Common Parameters<br>All the parameters of Partial 1 to 4 | Tone Edit |

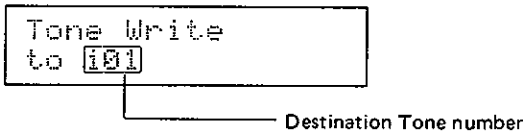
* The Tone Writing procedure will change all the Timbres that use the rewritten

**[Tone Writing Procedure]**




Step 1 With the unit turned to the Tone Edit mode, push WRITE/COPY.

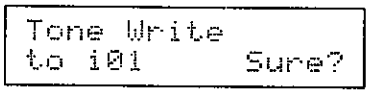
The Display responds with:




Step 2 Select a destination Tone Number (location for a new Tone). First select the internal or memory card mode with PARAMETER/GROUP ( ▽△ ), then a Number with VALUE/NUMBER ( ▲▼ ).

Step 3 Push ENTER.

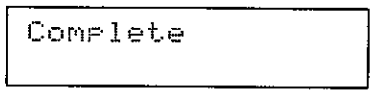
The Display responds with "Sure? "




Step 4 Push WRITE/COPY to continue.

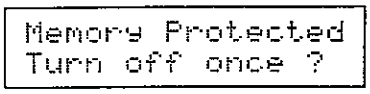
* To leave the mode, push EXIT, and the Display returns to the previous condition which is before any writing procedure was taken.

When the data is written properly, the Display responds as shown below for a while then returned to the Tone Edit Display.

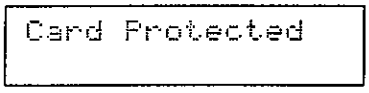



6

When writing data into the internal memory, and with the Memory Protect parameter set to ON, the following Display is shown. At this stage, you can carry on writing by pushing ENTER or leave the writing mode by pushing EXIT.




When writing data onto a memory card with the Memory Protect Switch set to the ON position, the following Display is shown for a while then the Tone Edit Display. Set the Protect Switch on the memory card to the OFF position, then repeat the above procedure.




* If a error message is shown in the Display, resolve it by following the instructions in "Error Message Table" on page 96.

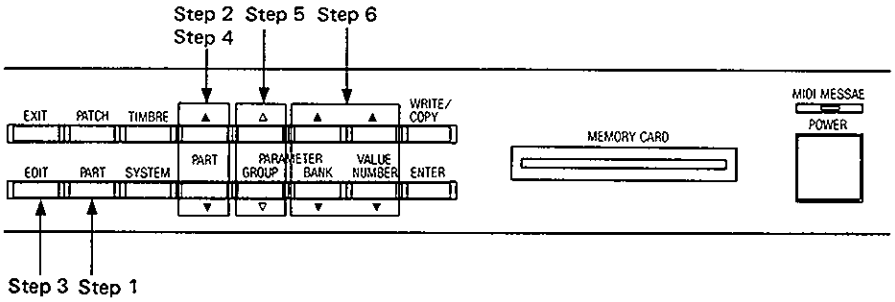
# 7 RHYTHM SETUP

The Rhythm Setup involves Tone, Volume, Pan, Output Mode, for each Key Number of the Rhythm Part. All these parameters are set for each pitch (Key) separately from C1 (24) to C8 (108).

Parameters for Rhythm Edit

| Display | Parameter |
|---|---|
| Tone | Tone (Group/Number) |
| Output Level | Output Level |
| Pan | Pan |
| Output Assign | Output Assign |

## 1. Editing Procedure




Step 1 Push PART.

Step 2 Using PART (▲▼), select the Rhythm Part.

Step 3 Push EDIT to enter the Rhythm Setup mode.

* If the Rhythm Part is not selected in Step 2, you cannot enter the Rhythm Setup mode.

Step 4 Select the Key Number to be edited with PART (▲▼).

Step 5 Select the parameter to be edited with PARAMETER/GROUP (▽△).

Step 6 Change the value with PARAMETER/BANK (▲▼) and VALUE/NUMBER (▲▼).

* Pressing PARAMETER/BANK (▲▼) will change values drastically (except selecting the Tone Group).

Step 7 Repeat Steps 4, 5 and 6.

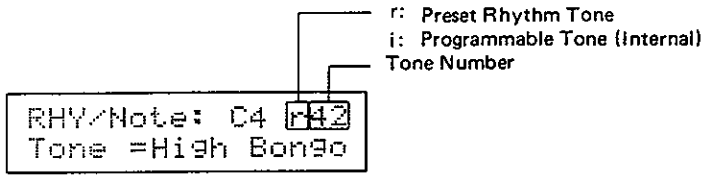
Step 8 When finished, push EXIT twice to return to the Play mode.

* Pushing EXIT once will select the Part Setting Display.

# 2. Rhythm Setup Parameters

- **Tone**

This selects a Rhythm Tone from 127 different Tones ( = 63 Preset Rhythm Tones and 64 user-programmable Tones in the internal memory.) At OFF, no Rhythm Tone is assigned.




The following are 63 Preset Rhythm Tones.

- Preset Rhythm Tones

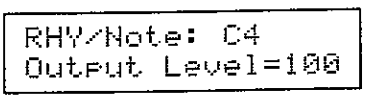
| Number | Tone Name |
|---|---|
| r01 | Closed High Hat-1 |
| r02 | Closed High Hat-2 |
| r03 | Open High Hat-1 |
| r04 | Open High Hat-2 |
| r05 | Crash Cymbal |
| r06 | Crash Cymbal(Short) |
| r07 | Crash Cymbal(Mute) |
| r08 | Ride Cymbal |
| r09 | Ride Cymbal(Short) |
| r10 | Ride Cymbal(Mute) |
| r11 | Cup |
| r12 | Cup(Mute) |
| r13 | China Cymbal |
| r14 | Splash Cymbal |
| r15 | Bass Drum-1 |
| r16 | Bass Drum-2 |
| r17 | Bass Drum-3 |
| r18 | Bass Drum-4 |
| r19 | Snare Drum-1 |
| r20 | Snare Drum-2 |
| r21 | Snare Drum-3 |
| r22 | Snare Drum-4 |
| r23 | Snare Drum-5 |
| r24 | Snare Drum-6 |
| r25 | Rim Shot |
| r26 | Brush-1 |
| r27 | Brush-2 |
| r28 | High Tom Tom-1 |
| r29 | Middle Tom Tom-1 |
| r30 | Low Tom Tom-1 |
| r31 | High Tom Tom-2 |
| r32 | Middle Tom Tom-2 |

| Number | Tone Name |
|---|---|
| r33 | Low Tom Tom-2 |
| r34 | High Tom Tom-3 |
| r35 | Middle Tom Tom-3 |
| r36 | Low Tom Tom-3 |
| r37 | High Pitch Tom Tom-1 |
| r38 | High Pitch Tom Tom-2 |
| r39 | Hand Clap |
| r40 | Tambourine |
| r41 | Cowbell |
| r42 | High Bongo |
| r43 | Low Bongo |
| r44 | High Conga(Mute) |
| r45 | High Conga |
| r46 | Low Conga |
| r47 | High Timbale |
| r48 | Low Timbale |
| r49 | High Agogo |
| r50 | Low Agogo |
| r51 | Cabasa |
| r52 | Maracas |
| r53 | Short Whistle |
| r54 | Long Whistle |
| r55 | Quijada |
| r56 | Claves |
| r57 | Castanets |
| r58 | Triangle |
| r59 | Wood Block |
| r60 | Bell |
| r61 | Native Drum-1 |
| r62 | Native Drum-2 |
| r63 | Native Drum-3 |
| r64 | OFF |

* r64 represents OFF. The OFF setting may be used for muting unnecessary sound.

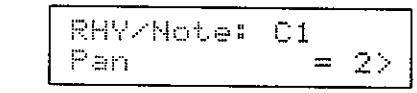
- **Output Level**

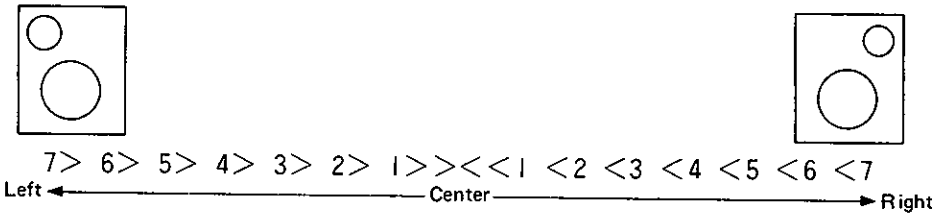
This sets the volume. 0 to 100 are valid, higher values increasing the volume.



- **Pan**

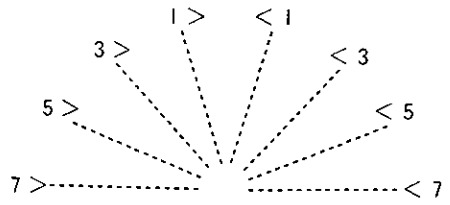
This sets the positioning of the sound image output in stereo through the Mix Output Sockets. 7> to <7 are valid, creating the sound imaging as shown below.




* Unless the Output Assign mode is set to MIX, the pan value set here has no effect.

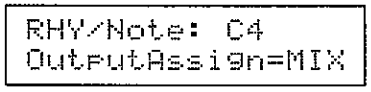
* When the Structure of monaural output is used, actual changes of panning are as shown below.




* When the Structure of a Tone is 8 or 9, the actural sound imaging of each Partial will vary. (See page 69.)

- **Output Assign**

This determines from which of the 1 to 6 Output Sockets or Mix Output Sockets the Tone should be output.




MIX: Sent in stereo through the MIX outupt Sockets
1–6: Sent through the Multi Output Sockets

* If the Reverb Type parameter is set to other than OFF, Multi Outputs 5 and 6 do not work.

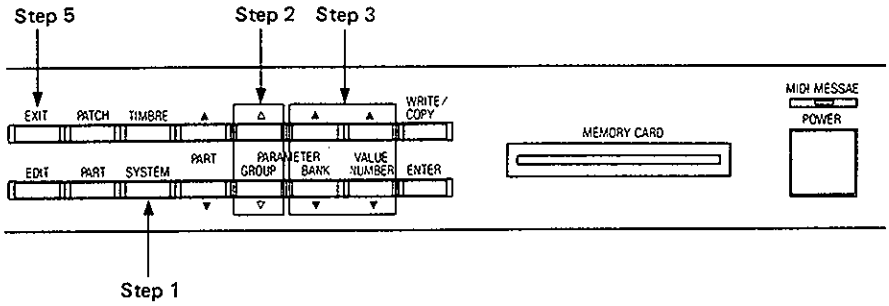
# 8 SYSTEM SETUP

The System Setup section involves the parameters that are related with the overall setting of the D-110, e.g. Master Tuning, Memory Protect.

Parameters for System Setup

| Display | Parameter |
|---|---|
| Mater Tune | Master Tuning |
| Mem Protect | Memory Protect |
| Control Ch. | Control Channel |
| Exclu Unit= | Exclusive Unit Number |
| Overflow | Overflow Assign Switch |

## 1. Editing Procedure




Step 1 Push SYSTEM.

Step 2 Using PARAMETER/GROUP ( ▽△ ), select the parameter to be edited.

Step 3 Change the value with PARAMETER/BANK (▲▼) and VALUE/NUMBER (▲▼).

* PARAMETER/BANK (▲▼) changes values drastically.

Step 4 Repeat Steps 2 and 3.

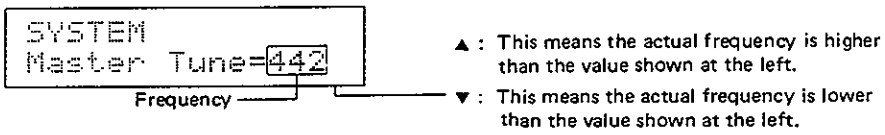
Step 5 Push EXIT to return to the Play mode.

* The edited values of the System Setup section will be retained even after the unit is turned off (except Memory Protect).

## 2. System Setup Parameters

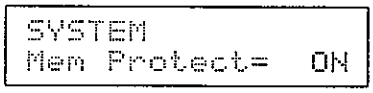
- **Master Tuning**

The Master Tuning sets the overall tuning of all the Parts from about 428 to 453 Hz ( = frequencies of the Standard Pitch A4). In the Master Tuning Display, pushing PARAMETER/BANK (▲▼) changes values in approx. 2 Hz steps, and VALUE/NUMBER (▲▼) changes values continuously.


SYSTEM
Master Tune=442
Frequency
▲ : This means the actual frequency is higher than the value shown at the left.
▼ : This means the actual frequency is lower than the value shown at the left.

- **Memory Protect**

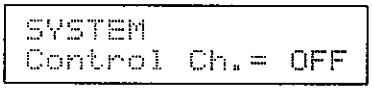
The Memory Protect function is provided for preventing data in the internal memory from accidental erasure. To write data into the internal memory you should set the Memory Protect to OFF. Even when you have forgotten to set the Memory Protect OFF, this can be temporarily changed as shown in the Writing Procedures previously explained.




* At power-up, the D-110 defaults to Memory Protect ON.

- **Control Channel**

This sets the MIDI channel on which Patch selecting (Program Change) messages are received. Usually, Program Change messages are received on a MIDI channel set in each Part, changing Timbres in the corresponding Part. However, Program Change messages may be used to change the entire Patch Data.




* If the MIDI channel set for a Part is the same number as the Control Channel, receiving Program Change will change Patches.

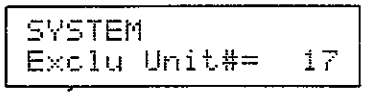
Program Change numbers correspond with Patch numbers as shown below.

| | Number / Bank | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| Internal | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | 2 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | 3 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| | 4 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| | 5 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| | 6 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| | 7 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 |
| | 8 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 |
| Memory Card | 1 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 |
| | 2 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| | 3 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 |
| | 4 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 |
| | 5 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 |
| | 6 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| | 7 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 |
| | 8 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |

* 0 to 127 Program Change messages are transmitted.

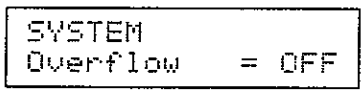
- **Exclusive Unit Number**

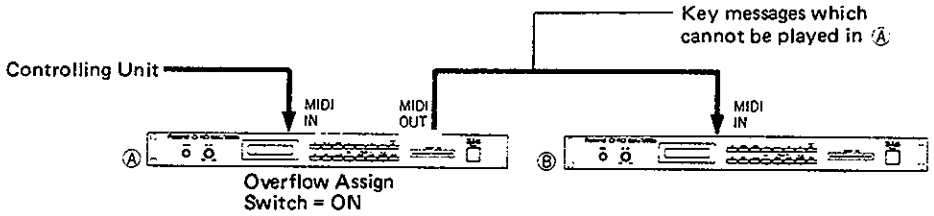
A Unit Number is used to identify an external MIDI device instead of the MIDI channel number, when data is received or transmitted via the Exclusive messages (only for Roland ID number). So, it is possible to send or receive the Exclusive messages by making sure the appropriate device number is used.




- **Overflow Assign Switch**

The D-110 features an Overflow Assign function which sends out any Key messages which exceed the maximum number of voices played simultaneously on the D-110, via the MIDI OUT. The Overflow Assign Switch selects whether to turn this function or not.




* When more than one Part is set to the same MIDI channel number, Key messages played on the D-110 will also be output from the MIDI OUT.

# 9 DATA TRANSFER

The entire data in the internal memory can be copied onto a memory card, or the entire data on a memory card into the internal memory. Also, using Roland MIDI Exclusive messages, the data can be transferred from one D-110 to another D-110.

The Data Transfer mode includes the following functions. Using each function, a Block of data can be transferred. Copying the internal data onto a memory card is called saving, and copying data on a memory card into the internal memory is called loading.

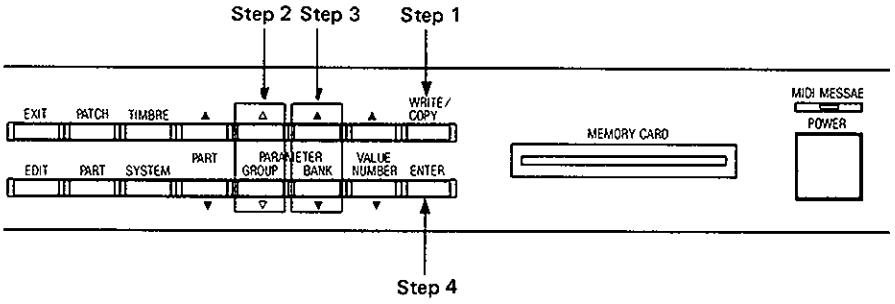
Functions in the Data Transfer Mode

| Display | Parameter |
|---|---|
| Save to Card | Save to Card |
| Load from Card | Load from Card |
| Dump One Way | Dump One Way |
| Dump Hand Shake | Dump Handshake |

Pushing the Enter Button in the Edit mode will make it possible to send the values of various parameters separately via Exclusive messages.

## 1. Data Transfer Mode

The Data Transfer mode includes various functions. Connections, necessary preparation and cautions to be taken differ depending on the function. Before executing those functions, please read the following.

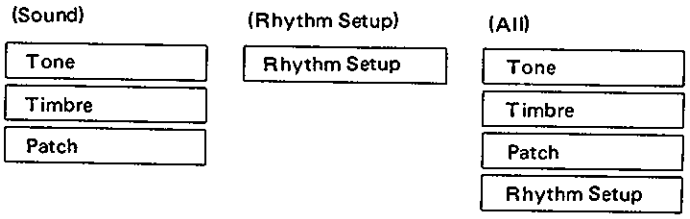



Step 1 With the unit turned to the Play mode, push WRITE/COPY.

* If you push WRITE/COPY from the Patch Select, Patch Edit, Timbre Select, Timbre Edit or Tone Edit mode, the unit will enter a Writing mode.

Step 2 Using PARAMETER/GROUP (▽△), select the desired function.

Step 3 Using PARAMETER/BANK (▲▼), select the Data Block to be transferred.

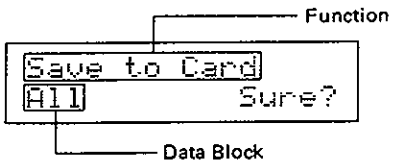


| | SOUND | RHYTHM SETUP | ALL |
|---|---|---|---|
| Save to Card | Save to Card<br>Sound | Save to Card<br>RhythmSetup | Save to Card<br>All |
| Load from Card | Load from Card<br>Sound | Load from Card<br>RhythmSetup | Load from Card<br>All |
| Dump One Way | Dump One Way<br>Sound | Dump One Way<br>RhythmSetup | Dump One Way<br>All |
| Dump Handshake | Dump Hand Shake<br>Sound | Dump Hand Shake<br>RhythmSetup | Dump Hand Shake<br>All |

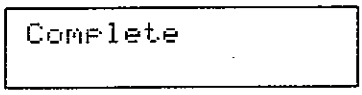
Step 4 Push ENTER.

Step 5 The Display shows "Sure?" To continue, push WRITE/COPY.

* If you wish to leave this mode, push EXIT, and then unit will return to the Play mode.




When data transfer has been completed, the following Display is shown for a while, then returned to the Play mode.



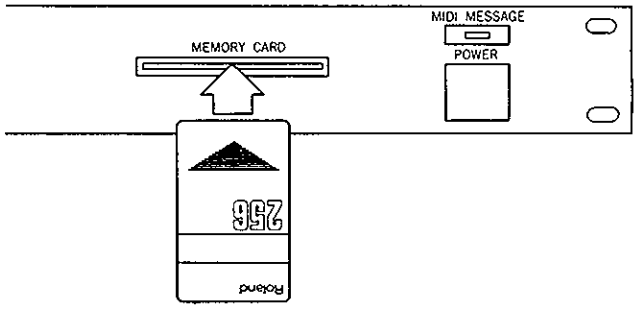

* If an Error Message is shown in the Display, resolve it by following the "Error Message Table" on page 96.

## 2. Data Transfer using a memory card

The Sound or Rhythm Setup data in the internal memory of the D-110 can be copied onto an optional memory card (M-256D or M-128D). Data which can be saved on the M-256D or M-128D differs as shown below.

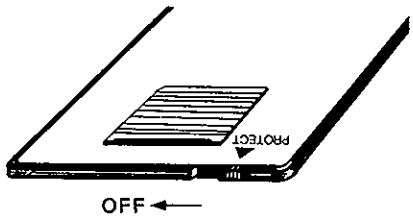
| | M-256D | M-128D |
|---|---|---|
| Tone | 64 | 32 |
| Timbre | 128 | 128 |
| Patch | 64 | 32 |
| Rhythm Setup | 1 | 1 |

Insert a memory card into the Card Slot.

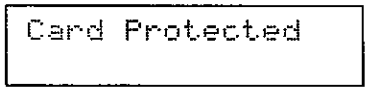



**[Internal➡Memory Card]**
(Save to Card)

Before saving data onto a memory card, set the Protect Switch on the memory card to OFF, and return it to ON when finished saving.




If you try to save with the Protect Switch set to ON, "Card Protected" is shown for a while then the screen returns to the previous Display. If this happens, repeat saving with the Protect Switch set to OFF this time.




- **When using a brand new card**

If you are using a brand new card or a card that contains data for other than the D-110, be sure to save data in the "All" mode.
"Illegal Card" is shown in the Display when you use a brand new card or a card that contains data for other than the D-110. To continue, push ENTER, and to leave, push EXIT.

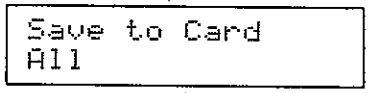
Set the Memory Protect Switch on the Memory Card to OFF.

↓

WRITE/COPY

↓

Select a function and data block.




* Select "All" when using a brand new memory card or a memory card that contains data for other than the D-110.

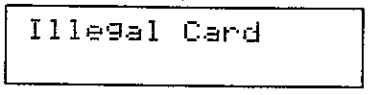
↓

ENTER

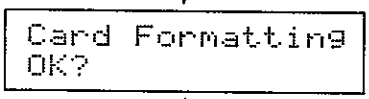
↓

WRITE/COPY

↓




↓




↓

ENTER

* Push EXIT to leave the mode.

9

* If an Error Message is shown in the Display, resolve it by following the "Error Message Table" on page 96.

**[Memory Card➡Internal]**
(Load from Card)

If the Memory Protect of the D-110 is set to ON, the Display responds as below. Pushing ENTER will cancel the Memory Protect making it possible to load, while pushing EXIT will leave the loading mode and return to the Play mode.

```
Memory Protected
Turn off once ?
```

* If an Error Message is shown in the Display, resolve it by following the "Error Message Table" on page 96.

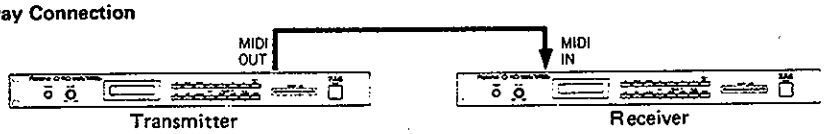
# 3. Data Transfer with MIDI (BULK)

Using Roland MIDI Exclusive messages, the data can be transferred from one D-110 to another D-110.

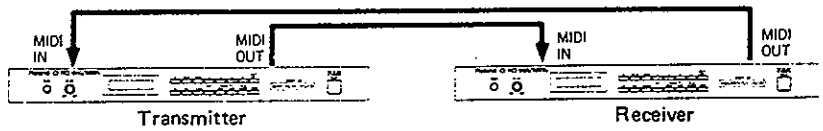
Data which can be transferred with the Exclusive messages are as shown below. It is also possible to transfer a block of data.
There are two methods of data transfer via MIDI; Handshake and One-way. Handshake allows you to verify whether the receiver is ready to receive the data. One-way transfers the data without confirming the condition of the receiver.

- **Connections**

**One-way Connection**




**Handshake Connection**




Set the Unit number of the receiver and transmitter to the same number. (Otherwise, data transfer is not possible.)

All the necessary procedures for data transfer (Dump one way, Dump handshake) should be performed on the transmitter unit.

When the data is properly copied, the Display responds as shown below for a while, then returns to the Play Mode Display.

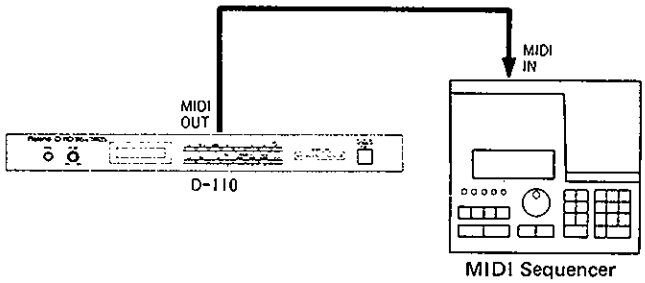
```
Complete
```

* If an Error Message is shown in the Display, resolve it by following the "Error Messages Table" on page 96.

# 4. Data Transfer via MIDI (INDIVIDUAL)

● **Connections**

Pushing the ENTER button in the Edit mode will transmit the value of the Parameter currently being edited through the MIDI OUT via One-way Exclusive nessages. Using this function, it is made possible to record the Exclusive messages of Parameter values into a MIDI sequencer, and change the values during playback.



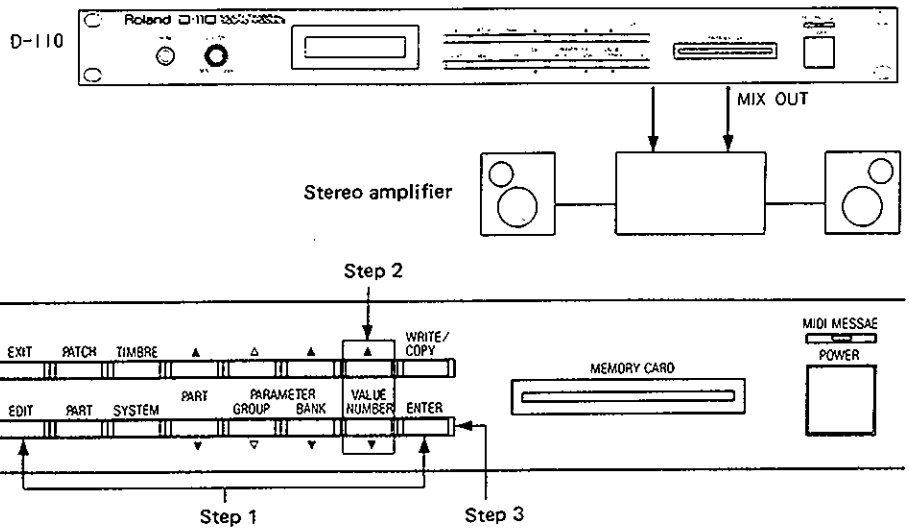

To record the Exclusive messages in a MIDI sequencer, select the appropriate parameter in the Edit mode, change the values, then push ENTER.

Exclusive messages which can be transmitted in each mode are as follows.

| Mode | Exclusive Message |
|---|---|
| Patch Select | All data contained in a Patch |
| Timber Select | Tone (Group/Number), Key Shift, Fine Tune, Bender Range, Assign Mode, Output Assign, Output Level, Pan, Key Range (U/L) |
| Timbre Edit (Tone Group/Number) | Tone Group/Number and Tone Parameter |
| Timbre Edit<br>(except for Tone/Group Number)<br>Part Setting<br>(except for Partial Reserve)<br>System (Master Tuning,<br>Memory Protect, Control Channel)<br>Rhythm Setup<br>Tone Edit | Parameter data being edited |
| Part Setting<br>(Partial Reserve) | Partial Reserve Data in 1 – 8 and the Rhythm Part |
| Patch Edit<br>(except for Patch Name) | Reverb Parameter Values (Reverb Type, Reverb Time, Reverb Level) |

# 10 ROM PLAY

8 different tunes are preprogrammed in the D-110 so that you can experience the excellent effect of the Multi Timbre function. Playing these tunes is called ROM play in this manual. To obtain the best effect of the Multi Timbre function, use a stereo amplifier, if possible.

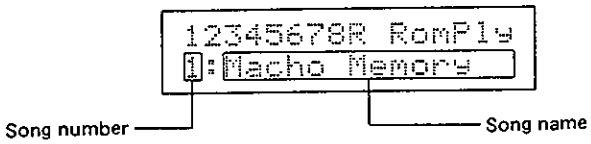



Step 1 Turn the unit to the Play mode, then push the EDIT button while holding the ENTER button down. The Display responds with:

```
12345678R RomPly
Chain of Songs
```

If you keep holding the ENTER button down, Songs 1 to 8 will be played in sequence.

Step 2 Select the song to be played with the VALUE/NUMBER ( ▲▼ ) buttons.




Step 3 Push the ENTER button to play the song you have selected.

* To stop playing, push the VALUE/NUMBER ( ▲▼ ) buttons, or EXIT.

* Pushing the EXIT button while no song is being played will return to the Play mode.

ROM Play Song Table

| Song Number | Song Name | |
|---|---|---|
| 1 | Macho Memory | Music by Eric Persing (c) 1988 by Eric Persing |
| 2 | Jah May Kah! | Music by Amin Bhatia (c) 1988 by Amin Bhatia |
| 3 | Sugar Plum | Composed by Tchaikovski Arranged by Amin Bhatia |
| 4 | My Brother | Music by Adrian Scott (c) 1988 by Adrian Scott |
| 5 | Folk | Music by Amin Bhatia (c) 1988 by Amin Bhatia |
| 6 | Bumble Dee | Composed by Rymsky-Kovsakow Arranged by Amin Bhatia |
| 7 | Mergatroid | Music by Eric Persing (c) 1988 by Eric Persing |
| 8 | Dinner Set | Music by Adrian Scott (c) 1988 by Adrian Scott |

# REFERENCE


1 LA SYNTHESIS
2 TROUBLE-SHOOTING
3 APPENDIX TABLES
4 GUIDE FOR USING THE D-110

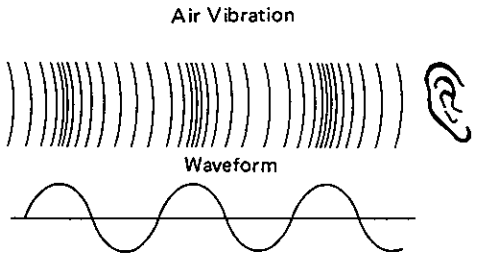
# 1 LA SYNTHESIS

LA stands for Linear Arithmetic synthesis which is the heart of the new technology. LA synthesis involves a great many technological advances resulting not only in a superior sound quality but also an improved ease of programming. In this way, Roland has succeeded in maintaining a high degree of familiarity to the user despite the technical wizerdry involved.

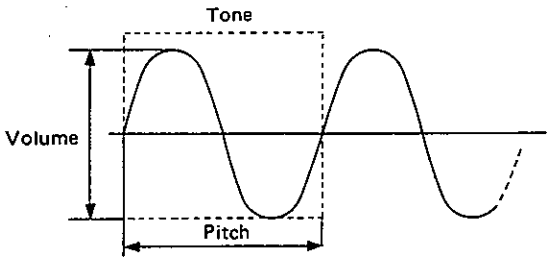
## 1. What is sound made of ?

**[Three Elements of a Sound]**

Sounds are air vibrations reaching our ears. By transforming the vibration into digital signals, they can be stored as "waves".

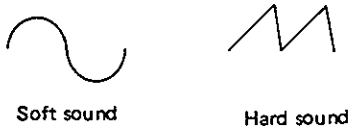



Basically, all sorts of sounds can be considered to consist of "pitch", "timbre" and "volume".

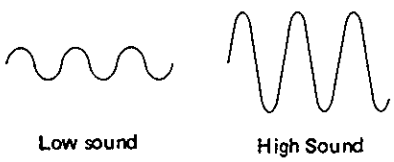



1) Pitch is determined by the number of waves ( = frequencies). Higher frequencies raise the pitch. Usually, pitch (frequency) is represented by Hz.

2) Timbre is determined by the shape of a wave. Generally speaking, round shapes wave make a soft sounds, and a sharp shapes make hard sounds.

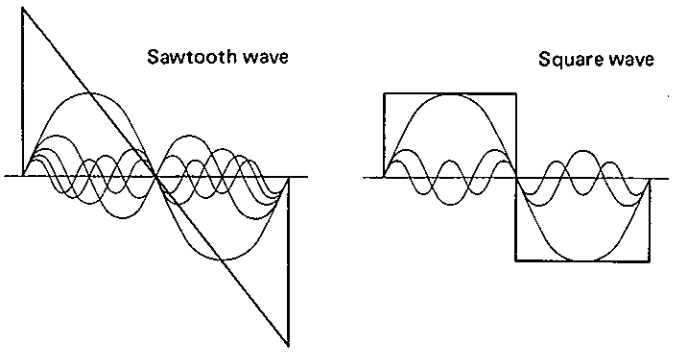



3) Volume is determined by the depth of a wave ( = amplitude). Larger waves have higher volumes.



**[Harmonics]**

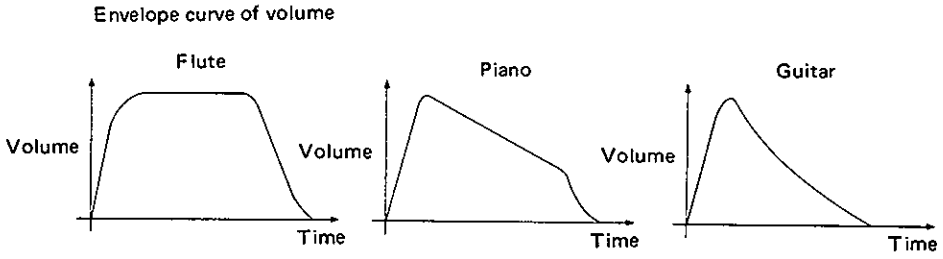
Timbre is determined by the shape of a wave. Then, how is the shape of a wave made? It is believed that a waveform consists of a great many sine waves. For example, a sawtooth is made by adding sine waves of all the multiples of the fundamental frequency.




The waves added to the fundamental are called "harmonics"; even number multiple harmonics and odd number multiple harmonics.
A timbre, in brief, is determined by the harmonic content of the wave.

**[Envelope]**

Each of the three elements, pitch, timbre and volume, has its own evelope curve. Each instrument sound has a different envelope.




**[Natural Sounds]**

A natural sound consists of various different sounds. For example, a piano consists of a sharp attack sound then a decay sound. These two are completely different sounds. Also, the timbre of a piano decay sound varies depending on the pitch.

## 2. Key point for sound creation

The LA system allows you to combine various different sections of sounds for making a sound. In other words, each independent Partial makes its own sounds, then combined (synthesized).

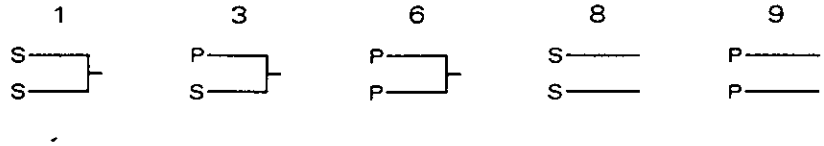
The Structure may be the most important parameter of the D-110, as it decides how to combine the Partials.

**1) Structure**

Please study the following examples.

13 Structures may be divided into two groups, with the ring modulator, and without.

**[Structures that do not use Ring Modulators]**

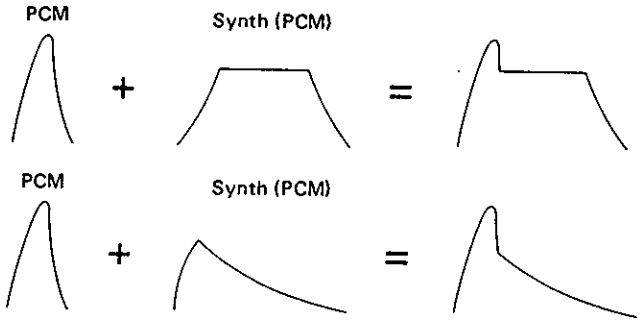



- **Structure 1/3/6**

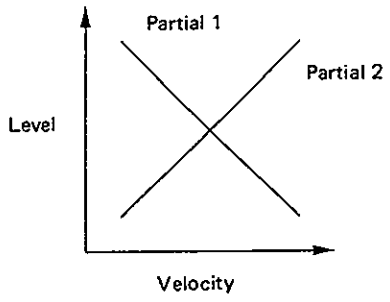
These can be combined as follows.

1) Set each Partial to the same, and detune slightly, and a fat sound can be created. Also, shifting the pitch by one octave or a 5th may be effective. This is suitable for strings or organ sounds.

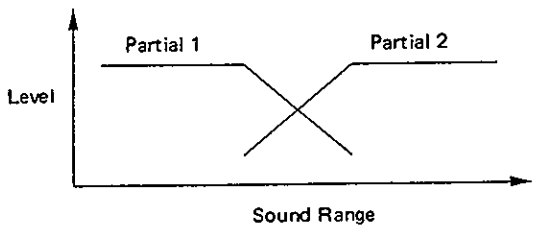
2) To make a realistic sound, use the PCM sound generator for the attack sound. For example, to create a wind instrument sound, make a blowing sound with the PCM generator, then sustained the sound with a PCM loop or a synthesizer generator.




3) Make a bright and dark sound in each Partial separately, then reverse the polarity of the TVA Velocity. Then the tone can be altered by changing how you play the keyboard.




4) Make the upper and lower section sound in each Partial separately, then reverse the bias setting of the TVA. Then different tones can be heard by changing the sound range.

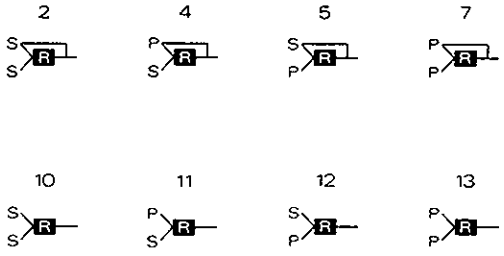



- **Structure 8/9**

This may be useful for creating stereo effects using one sound. However, the pan setting loses effect in this Structure, so the sound image cannot be changed.

### [Using the Ring Modulator]

The Ring Modulator cross-modulates two Partials resulting in odd number multiple harmonics. Important points in using the Ring Modulator are as follows.




When the output of either Partial is zero (the TVA level is set to zero or the Partial is muted), the other Partial is automatically sent.

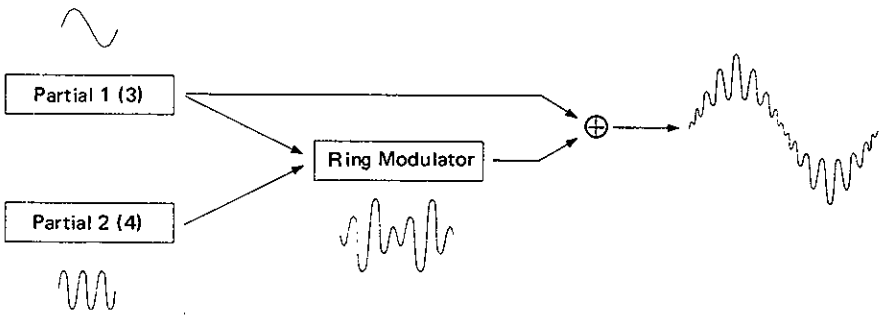
Partial 1 (3) always behaves as a fundamental and Partial 2 (4) as harmonic content.

Partial 1 (3) controls the overall volume.

Partial 2(4) controls the pitch and level of the harmonics.

When the pitch ratio of a Partial is a multiple of the fundamental, a clear sound is obtained. To create a transparent metallic sound, make as complete a sine wave as possible for Partial 1 (3).

PCM sounds normally include many odd number multiple harmonics, and therefore can become too "muddy" by using the Ring Modulator. Do not set the TVA level of Partial 2 (4) too high.




1

### 2) Editing

For easier and quicker editing, select a Tone which is similar to the sound you wish to make. Then set the D-110 to the Edit mode, and check the following points to study how the Partials are being used.
If you roughly understand how the sound is made, then changing the sound will be much easier.

- **Check the Partial Mute**

The Partial Mute is one of the parameters, and therefore is written in memory together with other parameters. The muted Partial is not being used.

- **Check how each Partial works**

  Using the Partial Mute function, listen to the sound of each Partial in use separately. You may pay attention to how sounds change depending on the sound range, or by the velocity. When using the Ring Modulator, muting one of the Partials will automatically send the other partial to the output.

- **Check the Structure**

  Using the Structure number, you can check how each Partial functions and how the Partials are combined.

# 2 TROUBLE-SHOOTING

## 1. Before calling for Service

The D-110 features so many functions that it may not always react as you expect because of improper setup. For example, the cause may lie in the amplifier used. Before calling a service center, check the following points.

**[No sound is heard or the volume is too low]**

- Check if the volume is set too low.
- Check if you can hear sound through the headphones. If so, there is something wrong with the cords or external device.
- Check if the MIDI channels of the D-110 and the external MIDI device are set to the same number.
- Check if the volume of the relevant Part is set too low.
- Check if the Output Assign is correctly set. If the Reverb Type in Patch Edit is set to other than OFF, Multi Outputs 5 and 6 do not work.
- Check if the D-110 is not set to the ROM Play mode. In the ROM Play mode, the D-110 does not receive MIDI messages. Turn to the Play mode by pushing the EXIT button.

**[Pitch is not normal]**

- Check if the Master Tuning is properly set.
- Check if the Key Shift in Timbre Edit is properly set.
- * If the pitch of a certain Timbre or Tone is strange, the cause will lie in the setting of that Timbre or Tone.

**[A Patch/Timbre cannot be called]**

- Check if the unit is not in the ROM Play mode. If so, push the EXIT button until the unit is returned to the Play mode.
- Check if the D-110 is not set to the Edit mode. If so, push the EXIT button to set to the Play mode.
- Check if the Control channel is set correctly.

**[Editing cannot be performed with the Programmer / Data Transfer cannot be performed with Exclusive messages]**

- Check if the MIDI Unit numbers of the relevant units are set to the same number.

# 2. Error Messages

When there is something wrong with the procedure you have taken or the D-110 itself, an Error Message will be shown in the Display. If so, resolve it as follows. If the same error message is shown repeatedly even though there seems to be no mistake in the operation, call a Roland service center.

```
Check
Internal Battery
```

- The battery for memory backup of the D-110 is low. Call your local Roland service center.

```
Check
Card's Battery
```

- The battery for memory backup in the optional memory card (M-256D or M-128D) is low. Replace with a new one (R2016) by following the instructions supplied with the memory card.

```
Memory Protected
Turn off once ?
```

- The Memory Protect in the D-110 is set to ON. Push the WRITE/COPY button to continue writing, and push the EXIT button to leave the mode.

```
Card Protected
```

- The Protect Switch on the memory card is set to the ON position. Set it to the OFF position.

```
Card Write Error
```

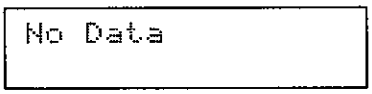
- Data is not correctly written on the memory card. Check if the memory card is correctly and securely connected to the D-110, then repeat saving.

```
Write Number Err
```

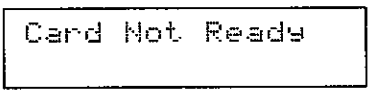
- This appears when you are using the M-128D memory card but you've tried to use Patches 51 to 88 or Tones 33 to 64 which do not exist on the M-128D. Check the Patch or Tone number, then repeat saving.

```
No Space
```

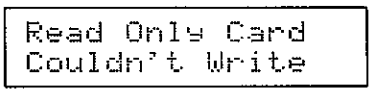
- This appears when you try to write Patches on a memory card that contains data for D-10/20.



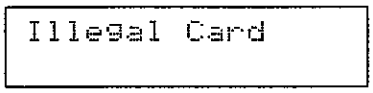

- This appears when you try to load Patches from a memory card that contains data for the D-10.



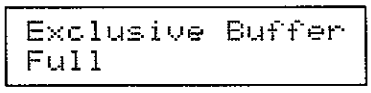

- No memory card is connected or a memory card is not connected securely. Insert the card securely.



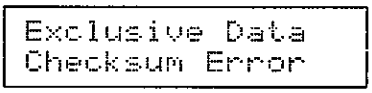

- You have tried to save data onto a ROM card. Data cannot be written onto a ROM card.



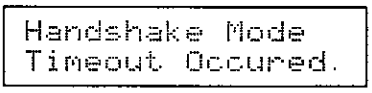

- The memory card you use does not contain any data or data for other than the D-110. To write data onto a memory card for the D-110, take "Internal Memory Card" copying procedure on page 85.



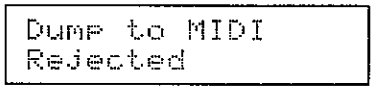

- This appears when the D-110 receives excess Exclusive messages.




- This is Check-sum error of Exclusive messages.




- When performing Handshake Dump, the D-110 is not connected to an external device which is to receive the D-110's Exclusive messages or the Unit number is not set to the same number.




- In Handshake Dump mode, the external device rejects data transferred from the D-110, such as when the external device is playing.

# 3 APPENDIX TABLES

## 1. Parameter Table

- Patch Parameters

| Parameter | Display | Variable Range |
|---|---|---|
| Patch Name | Name | (spc) A……Z, a……z, 0……9 & # ! ? . , : ; ' " * + − / < = > |
| Reverb Type | Reverb Type | 1……8, OFF |
| Reverb Time | Reverb Time | 1……8 |
| Reverb Level | Reverb Level | 0……7 |

- Timbre Parameters

| Parameters | Display | Variable Range |
|---|---|---|
| Tone | Tone | a01…a64, b01…b64, i01…i64 / c01…c64, r01…r63, r64(OFF) |
| Key Shift | Key Shift | −24……0……+24 |
| Fine Tune | Fine Tune | −50……0……+50 |
| Bender Range | Bender Range | 00……24 |
| Assign Mode | Assign Mode | 1……4 |
| Output Assign | Output Assign | MIX, 1……6 |

- Tone Parameters

[Common Parameters]

| Parameter | Display | Variable Range |
|---|---|---|
| Tone Name | Name | (spc) A……Z, a……z, 0……9 & # ! ? . , : ; ' " * + − / < = > |
| Structures 1&2 | Structure 1&2 | 01……13 |
| Structures 3&4 | Structure 3&4 | 01……13 |
| Partial Mute | Partial Mute | 0, 1 (each Partial) |
| ENV Mode | ENV Mode | NORMAL, NO SUS |

[Partial Parameters]

| Parameter Group | Parameter | Display | PCM | Variable Range |
|---|---|---|---|---|
| WG Group | Pitch Coarse | WG Pitch Cors | O | C1, C♯1……B8, C9 |
| | Pitch Fine | WG Pitch Fine | O | −50……0……+50 |
| | Key Follow (Pitch) | WG Pitch KF | O | −1, −1/2, −1/4, 0, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4 7/8, 1, 5/4, 3/2, 2, s1, s2 |
| | Bender Switch | WG Bender SW | O | OFF, ON |
| | Wave Form | WG Waveform | × | SQU, SAW |
| | PCM Wave Bank | PCM Bank | O | 1, 2 |
| | PCM Wave Number | PCM | O | 001……128 |
| | Pulse Width | WG Puls Width | × | 000…100 |
| | Velocity Sensitivity (Pulse Width) | WG PW Velo | × | −7……0……+7 |
| Pitch ENV Group | Pitch ENV Depth | P-ENV Depth | O | 000…010 |
| | Velocity Sensitivity (Depth) | P-ENV Velo | O | 0……3 |
| | Key Follow | P-ENV Time KF | O | 0……4 |
| | Time 1/2/3/4 | P-ENV T1(…4) | O | 000……100 |
| | Level 0/1/2 | P-ENV L0(…2) | O | −50……00……+50 |
| | Sustain Level | P-ENV Sus L | O | −50……00……+50 |
| | End Level | P-ENV End L | O | −50……00……+50 |
| LFO Group | Rate | P-LFO Rate | O | 000……100 |
| | Depth | P-LFO Depth | O | 000……100 |
| | Modulation Sensitivity | P-LFO Mod | O | 000……100 |
| TVF Group | Frequency | TVF Freq | × | 000……100 |
| | Resonance | TVF Reso | × | 00……30 |
| | Key Follow (Frequency) | TVF Freq KF | × | −1, −1/2, −1/4, 0, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4 7/8, 1, 5/4, 3/2, 2 |
| | Bias Point | TVF Bias P | × | <A1……<C7, >A1……>C7 |
| | Bias Level | TVF Bias Lv1 | × | −7……0……+7 |
| TVF ENV Group | ENV Depth | TVF-ENV Dept | × | 000……100 |
| | Velocity Sensitivity (Depth) | TVF-ENV Velo | × | 000……100 |
| | Key Follow (Depth) | TVF-ENV DKF | × | 0……4 |
| | Key Follow (Time) | TVF-ENV TKF | × | 0……4 |
| | Time 1/2/3/4/5 | TVF-ENV T1(…5) | × | 000……100 |
| | Level 1/2/3 | TVF-ENV L1(…3) | × | 000……100 |
| | Sustain Level | TVF-ENV Sus L | × | 000……100 |
| TVA Group | Level | TVA Level | O | 000……100 |
| | Velocity Sensitivity | TVA Velocity | O | −50……0……+50 |
| | Bias Point 1/2 | TVA Bias P1(2) | O | <A1……<C7, >A1……>C7 |
| | Bias Level 1/2 | TVA Bias L1(2) | O | −12……00 |
| TVA ENV Group | Key Follow (Time) | TVA-ENV TKF | O | 0……4 |
| | Velocity Follow (Time 1) | TVA-ENV T1VF | O | 0……4 |
| | Time 1/2/3/4/5 | TVA-ENV T1(…5) | O | 000……100 |
| | Level 1/2/3 | TVA-ENV L1(…3) | O | 000……100 |
| | Sustain Level | TVA-ENV Sus L | O | 000……100 |

● Part Setting

| Parameter | Display | Variable Range |
|---|---|---|
| Output Level | Output Level | 000·····100 |
| Pan | Pan | 7>·····><·····<7 |
| Key Range (Lower Limit) | Key Range(L) | C-1·····G10 |
| Key Range (Upper Limit) | Key Range(U) | C-1·····G10 |
| MIDI Channel | MIDI Channel | 01·····16, OFF |
| Partial Reserve | Ptl Reserve | 00·····32 (Up to 32 through all the Parts) |

● Rhythm Setup

| Parameter | Display | Variable Range |
|---|---|---|
| Tone | Tone | i01·····i64, r01·····r63, r64(OFF) |
| Output Level ↻ | Output Level | 000·····100 |
| Pan | Pan | 7>·····><·····<7 |
| Output Assign | Output Assign | MIX, 1·····6 |

● System Setup

| Parameter | Display | Variable Range |
|---|---|---|
| Master Tube | Master Tune | 428▼·····453▼ |
| Memory Protect | Mem Protect | OFF, ON |
| Control Channel | Control Ch. | 01·····16, OFF |
| Exclusive Unit Number | Exclu Unit # | 17·····32 |
| Overflow Assign Switch | Overflow | OFF, ON |

# 2. Preset Tones Table

**Group a**

| No. | Tone Name | Number of Partials |
|---|---|---|
| 01 | Acou Piano 1 | 3 |
| 02 | Acou Piano 2 | 2 |
| 03 | Acou Piano 3 | 2 |
| 04 | Honky-Tonk | 3 |
| 05 | Elec Piano 1 | 3 |
| 06 | Elec Piano 2 | 3 |
| 07 | Elec Piano 3 | 2 |
| 08 | Elec Piano 4 | 1 |
| 09 | Elec Organ 1 | 4 |
| 10 | Elec Organ 2 | 2 |
| 11 | Elec Organ 3 | 2 |
| 12 | Elec Organ 4 | 1 |
| 13 | Pipe Organ 1 | 3 |
| 14 | Pipe Organ 2 | 3 |
| 15 | Pipe Organ 3 | 2 |
| 16 | Accordion | 2 |
| 17 | Harpsi 1 | 3 |
| 18 | Harpsi 2 | 2 |
| 19 | Harpsi 3 | 1 |
| 20 | Clav 1 | 3 |
| 21 | Clav 2 | 2 |
| 22 | Clav 3 | 2 |
| 23 | Celesta 1 | 3 |
| 24 | Celesta 2 | 2 |
| 25 | Violin 1 | 3 |
| 26 | Violin 2 | 2 |
| 27 | Cello 1 | 3 |
| 28 | Cello 2 | 2 |
| 29 | Contrabass | 2 |
| 30 | Pizzicato | 3 |
| 31 | Harp 1 | 3 |
| 32 | Harp 2 | 2 |
| 33 | Strings 1 | 4 |
| 34 | Strings 2 | 3 |
| 35 | Strings 3 | 2 |
| 36 | Strings 4 | 3 |
| 37 | Brass 1 | 4 |
| 38 | Brass 2 | 3 |
| 39 | Brass 3 | 4 |
| 40 | Brass 4 | 4 |
| 41 | Trumpet 1 | 3 |
| 42 | Trumpet 2 | 2 |
| 43 | Trombone 1 | 3 |
| 44 | Trombone 2 | 2 |
| 45 | Horn | 3 |
| 46 | Fr Horn | 2 |
| 47 | Engl Horn | 2 |
| 48 | Tuba | 2 |
| 49 | Flute 1 | 4 |
| 50 | Flute 2 | 2 |
| 51 | Piccolo | 3 |
| 52 | Recorder | 2 |
| 53 | Pan Pipes | 3 |
| 54 | Bottleblow | 4 |
| 55 | Breathpipe | 4 |
| 56 | Whistle | 2 |
| 57 | Sax 1 | 2 |
| 58 | Sax 2 | 2 |
| 59 | Sax 3 | 2 |
| 60 | Clarinet 1 | 2 |
| 61 | Clarinet 2 | 3 |
| 62 | Oboe | 3 |
| 63 | Bassoon | 2 |
| 64 | Harmonica | 2 |

**Group b**

| No. | Tone Name | Number of Partials |
|---|---|---|
| 01 | Fantasy | 4 |
| 02 | Harmo Pan | 4 |
| 03 | Chorale | 3 |
| 04 | Glasses | 3 |
| 05 | Soundtrack | 4 |
| 06 | Atmosphere | 4 |
| 07 | Warm Bell | 4 |
| 08 | Space Horn | 4 |
| 09 | Echo Bell | 3 |
| 10 | Ice Rains | 4 |
| 11 | Oboe 2002 | 2 |
| 12 | Echo Pan | 2 |
| 13 | Bell Swing | 2 |
| 14 | Reso Synth | 2 |
| 15 | Steam Pad | 3 |
| 16 | Vibe String | 4 |
| 17 | Syn Lead 1 | 3 |
| 18 | Syn Lead 2 | 2 |
| 19 | Syn Lead 3 | 3 |
| 20 | Syn Lead 4 | 2 |
| 21 | Syn Bass 1 | 3 |
| 22 | Syn Bass 2 | 2 |
| 23 | Syn Bass 3 | 2 |
| 24 | Syn Bass 4 | 3 |
| 25 | Acou Bass 1 | 2 |
| 26 | Acou Bass 2 | 1 |
| 27 | Elec Bass 1 | 3 |
| 28 | Elec Bass 2 | 2 |
| 29 | Slap Bass 1 | 2 |
| 30 | Slap Bass 2 | 3 |
| 31 | Fretless 1 | 4 |
| 32 | Fretless 2 | 2 |
| 33 | Vibe | 2 |
| 34 | Glock | 3 |
| 35 | Marimba | 3 |
| 36 | Xylophone | 2 |
| 37 | Guitar 1 | 3 |
| 38 | Guitar 2 | 3 |
| 39 | Elec Gtr 1 | 4 |
| 40 | Elec Gtr 2 | 4 |
| 41 | Koto | 2 |
| 42 | Shamisen | 2 |
| 43 | Jamisen | 2 |
| 44 | Sho | 4 |
| 45 | Shakuhachi | 4 |
| 46 | Wadaiko Set | 4 |
| 47 | Sitar | 4 |
| 48 | Steel Drum | 4 |
| 49 | Tech Snare | 4 |
| 50 | Elec Tom | 4 |
| 51 | Revrse Cym | 2 |
| 52 | Ethno Hit | 4 |
| 53 | Timpani | 2 |
| 54 | Triangle | 2 |
| 55 | Wind Bell | 3 |
| 56 | Tube Bell | 4 |
| 57 | Orche Hit | 4 |
| 58 | Bird Tweet | 1 |
| 59 | One Note Jam | 4 |
| 60 | Telephone | 1 |
| 61 | Typewriter | 2 |
| 62 | Insect | 2 |
| 63 | Water Bells | 3 |
| 64 | Jungle Tune | 4 |

**Group r**

| No. | Tone Name | Number of Partials |
|---|---|---|
| r01 | Closed High Hat-1 | 1 |
| r02 | Closed High Hat-2 | 1 |
| r03 | Open High Hat-1 | 2 |
| r04 | Open High Hat-2 | 2 |
| r05 | Crash Cymbal | 2 |
| r06 | Crash Cymbal (Short) | 1 |
| r07 | Crash Cymbal (Mute) | 1 |
| r08 | Ride Cymbal | 2 |
| r09 | Ride Cymbal (Short) | 1 |
| r10 | Ride Cymbal (Mute) | 1 |
| r11 | Cup | 2 |
| r12 | Cup (Mute) | 1 |
| r13 | China Cymbal | 2 |
| r14 | Splash Cymbal | 1 |
| r15 | Bass Drum-1 | 2 |
| r16 | Bass Drum-2 | 1 |
| r17 | Bass Drum-3 | 2 |
| r18 | Bass Drum-4 | 1 |
| r19 | Snare Drum-1 | 1 |
| r20 | Snare Drum-2 | 1 |
| r21 | Snare Drum-3 | 1 |
| r22 | Snare Drum-4 | 2 |
| r23 | Snare Drum-5 | 1 |
| r24 | Snare Drum-6 | 1 |
| r25 | Rim Shot | 1 |
| r26 | Brush-1 | 2 |
| r27 | Brush-2 | 2 |
| r28 | High Tom Tom-1 | 1 |
| r29 | Middle Tom Tom-1 | 1 |
| r30 | Low Tom Tom-1 | 1 |
| r31 | High Tom Tom-2 | 1 |
| r32 | Middle Tom Tom-2 | 1 |
| r33 | Low Tom Tom-2 | 1 |
| r34 | High Tom Tom-3 | 2 |
| r35 | Middle Tom Tom-3 | 2 |
| r36 | Low Tom Tom-3 | 2 |
| r37 | High Pitch Tom Tom-1 | 1 |
| r38 | High Pitch Tom Tom-2 | 1 |
| r39 | Hand Clap | 1 |
| r40 | Tambourine | 1 |
| r41 | Cowbell | 1 |
| r42 | High Bongo | 1 |
| r43 | Low Bongo | 1 |
| r44 | High Conga (Mute) | 1 |
| r45 | High Conga | 1 |
| r46 | Low Conga | 1 |
| r47 | High Timbale | 1 |
| r48 | Low Timbale | 1 |
| r49 | High Agogo | 1 |
| r50 | Low Agogo | 1 |
| r51 | Cabasa | 1 |
| r52 | Maracas | 1 |
| r53 | Short Whistle | 2 |
| r54 | Long Whistle | 2 |
| r55 | Guijada | 3 |
| r56 | Claves | 1 |
| r57 | Castanets | 2 |
| r58 | Triangle | 2 |
| r59 | Wood Block | 1 |
| r60 | Bell | 2 |
| r61 | Native Drum-1 | 1 |
| r62 | Native Drum-2 | 1 |
| r63 | Native Drum-3 | 1 |
| OFF | | (0) |

# 3. Initial Rhythm Setting

Initial Setting of Rhythm Tones

| Note Name | Tone No. | Tone Name | No. of Partials |
|---|---|---|---|
| C1 (24) | r64 | OFF | (0) |
| C♯1(25) | r64 | OFF | (0) |
| D1 (26) | r64 | OFF | (0) |
| D♯1(27) | r64 | OFF | (0) |
| E1 (28) | r64 | OFF | (0) |
| F1 (29) | r64 | OFF | (0) |
| F♯1(30) | r64 | OFF | (0) |
| G1 (31) | r64 | OFF | (0) |
| G♯1(32) | r64 | OFF | (0) |
| A1 (33) | r64 | OFF | (0) |
| A♯1(34) | r64 | OFF | (0) |
| B1 (35) | r15 | Bass Drum-1 | 2 |
| C2 (36) | r16 | Bass Drum-2 | 1 |
| C♯2(37) | r25 | Rim Shot | 1 |
| D2 (38) | r19 | Snare Drum-1 | 1 |
| D♯2(39) | r39 | Hand Clap | 1 |
| E2 (40) | r20 | Snare Drum-2 | 1 |
| F2 (41) | r30 | Low Tom Tom-1 | 1 |
| F♯2(42) | r01 | Closed High Hat-1 | 1 |
| G2 (43) | r33 | Low Tom Tom-2 | 1 |
| G♯2(44) | r04 | Open High Hat-2 | 2 |
| A2 (45) | r29 | Middle Tom Tom-1 | 1 |
| A♯2(46) | r03 | Open High Hat-1 | 2 |
| B2 (47) | r32 | Middle Tom Tom-2 | 1 |
| C3 (48) | r28 | High Tom Tom-1 | 1 |
| C♯3(49) | r05 | Crash Cymbal | 2 |
| D3 (50) | r31 | High Tom Tom-2 | 1 |
| D♯3(51) | r08 | Ride Cymbal | 2 |
| E3 (52) | r13 | China Cymbal | 2 |
| F3 (53) | r11 | Cup | 2 |
| F♯3(54) | r40 | Tambourine | 1 |
| G3 (55) | r14 | Splash Cymbal | 1 |
| G♯3(56) | r41 | Cowbell | 1 |
| A3 (57) | r07 | Crash Cymbal (Mute) | 1 |
| A♯3(58) | r21 | Snare Drum-3 | 1 |
| B3 (59) | r10 | Ride Cymbal (Mute) | 1 |
| C4 (60) | r42 | High Bongo | 1 |
| C♯4(61) | r43 | Low Bongo | 1 |
| D4 (62) | r44 | High Conga (Mute) | 1 |
| D♯4(63) | r45 | High Conga | 1 |
| E4 (64) | r46 | Low Conga | 1 |
| F4 (65) | r47 | High Timbale | 1 |
| F♯4(66) | r48 | Low Timbale | 1 |
| G4 (67) | r49 | High Agogo | 1 |
| G♯4(68) | r50 | Low Agogo | 1 |
| A4 (69) | r51 | Cabasa | 1 |
| A♯4(70) | r52 | Maracas | 1 |
| B4 (71) | r53 | Short Whistle | 2 |

| Note Name | Tone No. | Tone Name | No. of Partials |
|---|---|---|---|
| C5 (72) | r54 | Long Whistle | 2 |
| C♯5(73) | r55 | Quijada | 3 |
| D5 (74) | r12 | Cup (Mute) | 1 |
| D♯5(75) | r56 | Claves | 1 |
| E5 (76) | r26 | Brush-1 | 2 |
| F5 (77) | r27 | Brush-2 | 2 |
| F♯5(78) | r57 | Castanets | 2 |
| G5 (79) | r38 | High Pitch Tom Tom-2 | 1 |
| G♯5(80) | r58 | Triangle | 2 |
| A5 (81) | r37 | High Pitch Tom Tom-1 | 1 |
| A♯5(82) | r59 | Wood Block | 1 |
| B5 (83) | r60 | Bell | 2 |
| C6 (84) | r17 | Bass Drum-3 | 2 |
| C♯6(85) | r18 | Bass Drum-4 | 1 |
| D6 (86) | r22 | Snare Drum-4 | 2 |
| D♯6(87) | r23 | Snare Drum-5 | 1 |
| E6 (88) | r24 | Snare Drum-6 | 1 |
| F6 (89) | r36 | Low Tom Tom-3 | 2 |
| F♯6(90) | r02 | Closed High Hat-2 | 1 |
| G6 (91) | r35 | Middle Tom Tom-3 | 2 |
| G♯6(92) | r06 | Crash Cymbal (Short) | 1 |
| A6 (93) | r34 | High Tom Tom-3 | 2 |
| A♯6(94) | r09 | Ride Cymbal (Short) | 1 |
| B6 (95) | r61 | Native Drum-1 | 1 |
| C7 (96) | r62 | Native Drum-2 | 1 |
| C♯7(97) | r63 | Native Drum-3 | 1 |
| D7 (98) | r64 | OFF | (0) |
| D♯7(99) | r64 | OFF | (0) |
| E7 (100) | r64 | OFF | (0) |
| F7 (101) | r64 | OFF | (0) |
| F♯7(102) | r64 | OFF | (0) |
| G7 (103) | r64 | OFF | (0) |
| G♯7(104) | r64 | OFF | (0) |
| A7 (105) | r64 | OFF | (0) |
| A♯7(106) | r64 | OFF | (0) |
| B7 (107) | r64 | OFF | (0) |
| C8 (108) | r64 | OFF | (0) |

* Rhythm sound is not available at r64.

# 4. PCM Sounds Table

[Bank 1]

| No. | PCM Name | Remarks |
|---|---|---|
| 001 | Bass Drum-1 | Rhythm Sound |
| 002 | Bass Drum-2 | |
| 003 | Bass Drum-3 | |
| 004 | Snare Drum-1 | |
| 005 | Snare Drum-2 | |
| 006 | Snare Drum-3 | |
| 007 | Snare Drum-4 | |
| 008 | Tom Tom-1 | |
| 009 | Tom Tom-2 | |
| 010 | High-Hat | |
| 011 | High-Hat (Loop) | |
| 012 | Crash Cymbal-1 | |
| 013 | Crash Cymbal-2 (Loop) | |
| 014 | Ride Cymbal-1 | |
| 015 | Ride Cymbal-2 (Loop) | |
| 016 | Cup | |
| 017 | China Cymbal-1 | |
| 018 | China Cymbal-2 (Loop) | |
| 019 | Rim Shot | |
| 020 | Hand Clap | |
| 021 | Mute High Conga | |
| 022 | Conga | |
| 023 | Bongo | |
| 024 | Cowbell | |
| 025 | Tambourine | |
| 026 | Agogo | |
| 027 | Claves | |
| 028 | Timbale High | |
| 029 | Timbale Low | |
| 030 | Cabasa | |
| 031 | Timpani Attack | Attack Sound |
| 032 | Timpani | |
| 033 | Acoustic Piano High | |
| 034 | Acoustic Piano Low | |
| 035 | Piano Forte Thump | |
| 036 | Organ Percussion | |
| 037 | Trumpet | |
| 038 | Lips | |
| 039 | Trombone | |
| 040 | Clarinet | |
| 041 | Flute High | |
| 042 | Flute Low | |
| 043 | Steamer | |
| 044 | Indian Flute | |
| 045 | Breath | |
| 046 | Vibraphone High | |
| 047 | Vibraphone Low | |
| 048 | Marimba | |
| 049 | Xylophone High | |
| 050 | Xylophone Low | |
| 051 | Kalimba | |
| 052 | Wind Bell | |
| 053 | Chime Bar | |
| 054 | Hammer | |
| 055 | Guiro | |
| 056 | Chink | |
| 057 | Nails | |
| 058 | Fretless Bass | |
| 059 | Pull Bass | |
| 060 | Slap Bass | |
| 061 | Thump Bass | |
| 062 | Acoustic Bass | |
| 063 | Electric Bass | |
| 064 | Gut Guitar | |

| No. | PCM Name | Remarks |
|---|---|---|
| 065 | Steel Guitar | |
| 066 | Dirty Guitar | |
| 067 | Pizzicato | |
| 068 | Harp | |
| 069 | Contrabass | |
| 070 | Cello | |
| 071 | Violin-1 | |
| 072 | Violin-2 | |
| 073 | Koto | |
| 074 | Drawbars (Loop) | Sustained Sound |
| 075 | High Organ (Loop) | |
| 076 | Low Organ (Loop) | |
| 077 | Trumpet (Loop) | |
| 078 | Trombone (Loop) | |
| 079 | Sax-1 (Loop) | |
| 080 | Sax-2 (Loop) | |
| 081 | Reed (Loop) | |
| 082 | Slap Bass (Loop) | |
| 083 | Acoustic Bass (Loop) | |
| 084 | Electric Bass-1 (Loop) | |
| 085 | Electric Bass-2 (Loop) | |
| 086 | Gut Guitar (Loop) | |
| 087 | Steel Guitar (Loop) | |
| 088 | Electric Guitar (Loop) | |
| 089 | Clav (Loop) | |
| 090 | Cello (Loop) | |
| 091 | Violin (Loop) | |
| 092 | Electric Piano-1 (Loop) | |
| 093 | Electric Piano-2 (Loop) | |
| 094 | Harpsichord-1 (Loop) | |
| 095 | Harpsichord-2 (Loop) | |
| 096 | Telephone Bell (Loop) | |
| 097 | Female Voice-1 (Loop) | |
| 098 | Female Voice-2 (Loop) | |
| 099 | Male Voice-1 (Loop) | |
| 100 | Male Voice-2 (Loop) | |
| 101 | Spectrum-1 (Loop) | |
| 012 | Spectrum-2 (Loop) | |
| 103 | Spectrum-3 (Loop) | |
| 104 | Spectrum-4 (Loop) | |
| 105 | Spectrum-5 (Loop) | |
| 106 | Spectrum-6 (Loop) | |
| 107 | Spectrum-7 (Loop) | |
| 108 | Spectrum-8 (Loop) | |
| 109 | Spectrum-9 (Loop) | |
| 110 | Spectrum-10 (Loop) | |
| 111 | Noise (Loop) | |
| 112 | Shot-1 | Decay Sound |
| 113 | Shot-2 | |
| 114 | Shot-3 | |
| 115 | Shot-4 | |
| 116 | Shot-5 | |
| 117 | Shot-6 | |
| 118 | Shot-7 | |
| 119 | Shot-8 | |
| 120 | Shot-9 | |
| 121 | Shot-10 | |
| 122 | Shot-11 | |
| 123 | Shot-12 | |
| 124 | Shot-13 | |
| 125 | Shot-14 | |
| 126 | Shot-15 | |
| 127 | Shot-16 | |
| 128 | Shot-17 | |

* When Sound Number is set between 112 and 128, click noise may be caused in some parameters of TVA ENV.

[Bank 2]

| No. | PCM Name | Remarks |
|---|---|---|
| 001 | Bass Drum-1* | Rhythm Sound (The pitch is not affected by Master Tuning.) |
| 002 | Bass Drum-2* | |
| 003 | Bass Drum-3* | |
| 004 | Snare Drum-1* | |
| 005 | Snare Drum-2* | |
| 006 | Snare Drum-3* | |
| 007 | Snare Drum-4* | |
| 008 | Tom Tom-1* | |
| 009 | Tom Tom-2* | |
| 010 | High-Hat* | |
| 011 | High-Hat* (Loop) | |
| 012 | Crash Cymbal-1* | |
| 013 | Crash Cymbal-2* Loop) | |
| 014 | Ride Cymbal-1* | |
| 015 | Ride Cymbal-2* (Loop) | |
| 016 | Cup* | |
| 017 | China Cymbal-1* | |
| 018 | China Cymbal-2* (Loop) | |
| 019 | Rim Shot* | |
| 020 | Hand Clap* | |
| 021 | Mute High Conga* | |
| 022 | Conga* | |
| 023 | Bongo* | |
| 024 | Cowbell* | |
| 025 | Tambourine* | |
| 026 | Agogo* | |
| 027 | Claves* | |
| 028 | Timbale High* | |
| 029 | Timbale Low* | |
| 030 | Cabasa* | |
| 031 | Loop-1 | Effect Sound (Repeats of the same sound) |
| 032 | Loop-2 | |
| 033 | Loop-3 | |
| 034 | Loop-4 | |
| 035 | Loop-5 | |
| 036 | Loop-6 | |
| 037 | Loop-7 | |
| 038 | Loop-8 | |
| 039 | Loop-9 | |
| 040 | Loop-10 | |
| 041 | Loop-11 | |
| 042 | Loop-12 | |
| 043 | Loop-13 | |
| 044 | Loop-14 | |
| 045 | Loop-15 | |
| 046 | Loop-16 | |
| 047 | Loop-17 | |
| 048 | Loop-18 | |
| 049 | Loop-19 | |
| 050 | Loop-20 | |
| 051 | Loop-21 | |
| 052 | Loop-22 | |
| 053 | Loop-23 | |
| 054 | Loop-24 | |
| 055 | Loop-25 | |
| 056 | Loop-26 | |
| 057 | Loop-27 | |
| 058 | Loop-28 | |
| 059 | Loop-29 | |
| 060 | Loop-30 | |
| 061 | Loop-31 | |
| 062 | Loop-32 | |
| 063 | Loop-33 | |
| 064 | Loop-34 | |

| No. | PCM Name | Remarks |
|---|---|---|
| 065 | Loop-35 | |
| 066 | Loop-36 | |
| 067 | Loop-37 | |
| 068 | Loop-38 | |
| 069 | Loop-39 | |
| 070 | Loop-40 | |
| 071 | Loop-41 | |
| 072 | Loop-42 | |
| 073 | Loop-43 | |
| 074 | Loop-44 | |
| 075 | Loop-45 | |
| 076 | Loop-46 | |
| 077 | Loop-47 | |
| 078 | Loop-48 | |
| 079 | Loop-49 | |
| 080 | Loop-50 | |
| 081 | Loop-51 | |
| 082 | Loop-52 | |
| 083 | Loop-53 | |
| 084 | Loop-54 | |
| 085 | Loop-55 | |
| 086 | Loop-56 | |
| 087 | Loop-57 | |
| 088 | Loop-58 | |
| 089 | Loop-59 | |
| 090 | Loop-60 | |
| 091 | Loop-61 | |
| 092 | Loop-62 | |
| 093 | Loop-63 | |
| 094 | Loop-64 | |
| 095 | Jam-1 (Loop) | Effect Sound (Repeats of combined sounds) |
| 096 | Jam-2 (Loop) | |
| 097 | Jam-3 (Loop) | |
| 098 | Jam-4 (Loop) | |
| 099 | Jam-5 (Loop) | |
| 100 | Jam-6 (Loop) | |
| 101 | Jam-7 (Loop) | |
| 102 | Jam-8 (Loop) | |
| 103 | Jam-9 (Loop) | |
| 104 | Jam-10 (Loop) | |
| 105 | Jam-11 (Loop) | |
| 106 | Jam-12 (Loop) | |
| 107 | Jam-13 (Loop) | |
| 108 | Jam-14 (Loop) | |
| 109 | Jam-15 (Loop) | |
| 110 | Jam-16 (Loop) | |
| 111 | Jam-17 (Loop) | |
| 112 | Jam-18 (Loop) | |
| 113 | Jam-19 (Loop) | |
| 114 | Jam-20 (Loop) | |
| 115 | Jam-21 (Loop) | |
| 116 | Jam-22 (Loop) | |
| 117 | Jam-23 (Loop) | |
| 118 | Jam-24 (Loop) | |
| 119 | Jam-25 (Loop) | |
| 120 | Jam-26 (Loop) | |
| 121 | Jam-27 (Loop) | |
| 122 | Jam-28 (Loop) | |
| 123 | Jam-29 (Loop) | |
| 124 | Jam-30 (Loop) | |
| 125 | Jam-31 (Loop) | |
| 126 | Jam-32 (Loop) | |
| 127 | Jam-33 (Loop) | |
| 128 | Jam-34 (Loop) | |

# 5. Blank Chart

● Patch

| Patch No. | | Patch Name | | | |
|---|---|---|---|---|---|
| Reverb Type | | Reverb Time | | Reverb Level | |

| | Part 1 | Part 2 | Part 3 | Part 4 | Part 5 | Part 6 | Part 7 | Part 8 | Part R |
|---|---|---|---|---|---|---|---|---|---|
| Output Level | | | | | | | | | |
| Pan | | | | | | | | | |
| Key Range (L) | | | | | | | | | |
| Key Range (U) | | | | | | | | | |
| MIDI Channel | | | | | | | | | |
| Partial Reserve | | | | | | | | | |
| Tone Select | | | | | | | | | |
| Key Shift | | | | | | | | | |
| Fine Tune | | | | | | | | | |
| Bender Range | | | | | | | | | |
| Assign Mode | | | | | | | | | |
| Output Assign | | | | | | | | | |

| Patch No. | | Patch Name | | | |
|---|---|---|---|---|---|
| Reverb Type | | Reverb Time | | Reverb Level | |

| | Part 1 | Part 2 | Part 3 | Part 4 | Part 5 | Part 6 | Part 7 | Part 8 | Part R |
|---|---|---|---|---|---|---|---|---|---|
| Output Level | | | | | | | | | |
| Pan | | | | | | | | | |
| Key Range (L) | | | | | | | | | |
| Key Range (U) | | | | | | | | | |
| MIDI Channel | | | | | | | | | |
| Partial Reserve | | | | | | | | | |
| Tone Select | | | | | | | | | |
| Key Shift | | | | | | | | | |
| Fine Tune | | | | | | | | | |
| Bender Range | | | | | | | | | |
| Assign Mode | | | | | | | | | |
| Output Assign | | | | | | | | | |

## • Tone

(Common Parameters)

| Tone No. | | | Tone Name | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Structure | 1&2 | 3&4 | Partial Mute | 1 | 2 | 3 | 4 | ENV Mode | |
| | | | | | | | | | |

(Partial Prameters)

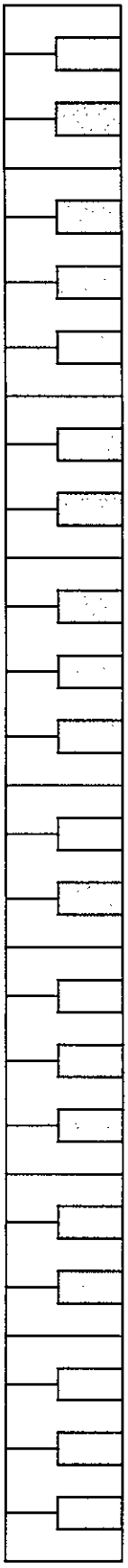
| | | Partial | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| WG | Pitch Cors | | | | |
| | Pitch Fine | | | | |
| | Pitch KF | | | | |
| | Bender SW | | | | |
| | Waveform | | | | |
| | PCM Bank | | | | |
| | PCM No. | | | | |
| | Pulse Width | | | | |
| | PW Velocity | | | | |
| Pitch ENV | Depth | | | | |
| | Velocity | | | | |
| | KF(Time) | | | | |
| | T1 | | | | |
| | T2 | | | | |
| | T3 | | | | |
| | T4 | | | | |
| | L0 | | | | |
| | L1 | | | | |
| | L2 | | | | |
| | Sus L | | | | |
| | End L | | | | |
| LFO | Rate | | | | |
| | Depth | | | | |
| | Modulation | | | | |
| TVF | Frequency | | | | |
| | Resonence | | | | |
| | KF(Freq) | | | | |
| | Bias P | | | | |
| | Bias L | | | | |

| | | Partial | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| TVF ENV | Depth | | | | |
| | Velocity | | | | |
| | KF(Depth) | | | | |
| | KF(Time) | | | | |
| | T1 | | | | |
| | T2 | | | | |
| | T3 | | | | |
| | T4 | | | | |
| | T5 | | | | |
| | L1 | | | | |
| | L2 | | | | |
| | L3 | | | | |
| | Sus L | | | | |
| TVA | Level | | | | |
| | Velocity | | | | |
| | Bias P1 | | | | |
| | Bias L1 | | | | |
| | Bias P2 | | | | |
| | Bias L2 | | | | |
| TVA ENV | KF(Time) | | | | |
| | Velocity Follow(T1) | | | | |
| | T1 | | | | |
| | T2 | | | | |
| | T3 | | | | |
| | T4 | | | | |
| | T5 | | | | |
| | L1 | | | | |
| | L2 | | | | |
| | L3 | | | | |
| | Sus L | | | | |

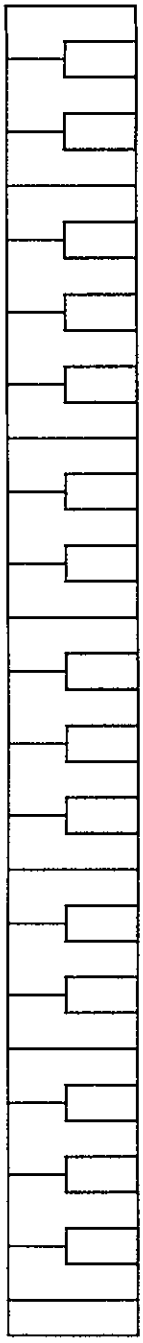
☐ are the parameters unfit for PCM Sound Generator.

(Rhythm Setup)

| Note Name | Tone | Level | Pan | Output |
|---|---|---|---|---|
| C1 (24) | | | | |
| C♯1(25) | | | | |
| D1 (26) | | | | |
| D♯1(27) | | | | |
| E1 (28) | | | | |
| F1 (29) | | | | |
| F♯1(30) | | | | |
| G1 (31) | | | | |
| G♯1(32) | | | | |
| A1 (33) | | | | |
| A♯1(34) | | | | |
| B1 (35) | | | | |
| C2 (36) | | | | |
| C♯2(37) | | | | |
| D2 (38) | | | | |
| D♯2(39) | | | | |
| E2 (40) | | | | |
| F2 (41) | | | | |
| F♯2(42) | | | | |
| G2 (43) | | | | |
| G♯2(44) | | | | |
| A2 (45) | | | | |
| A♯2(46) | | | | |
| B2 (47) | | | | |
| C3 (48) | | | | |
| C♯3(49) | | | | |
| D3 (50) | | | | |
| D♯3(51) | | | | |
| E3 (52) | | | | |
| F3 (53) | | | | |
| F♯3(54) | | | | |
| G3 (55) | | | | |
| G 3(56) | | | | |
| A3 (57) | | | | |
| A♯3(58) | | | | |
| B3 (59) | | | | |
| C4 (60) | | | | |
| C♯4(61) | | | | |
| D4 (62) | | | | |
| D♯4(63) | | | | |
| E4 (64) | | | | |
| F4 (65) | | | | |
| F♯4(66) | | | | |
| G4 (67) | | | | |
| G♯4(68) | | | | |
| A4 (69) | | | | |
| A♯4(70) | | | | |
| B4 (71) | | | | |




| Note Name | Tone | Level | Pan | Output |
|---|---|---|---|---|
| C5 (72) | | | | |
| C♯5(73) | | | | |
| D5 (74) | | | | |
| D♯5(75) | | | | |
| E5 (76) | | | | |
| F5 (77) | | | | |
| F♯5(78) | | | | |
| G5 (79) | | | | |
| G♯5(80) | | | | |
| A5 (81) | | | | |
| A♯5(82) | | | | |
| B5 (83) | | | | |
| C6 (84) | | | | |
| C♯6(85) | | | | |
| D6 (86) | | | | |
| D♯6(87) | | | | |
| E6 (88) | | | | |
| F6 (89) | | | | |
| F♯6(90) | | | | |
| G6 (91) | | | | |
| G♯6(92) | | | | |
| A6 (93) | | | | |
| A♯6(94) | | | | |
| B6 (95) | | | | |
| C7 (96) | | | | |
| C♯7(97) | | | | |
| D7 (98) | | | | |
| D♯7(99) | | | | |
| E7 (100) | | | | |
| F7 (101) | | | | |
| F♯7(102) | | | | |
| G7 (103) | | | | |
| G♯7(104) | | | | |
| A7 (105) | | | | |
| A♯7(106) | | | | |
| B7 (107) | | | | |
| C8 (108) | | | | |



# 4 GUIDE FOR USING THE D-110

### [Changing Timbres in each Part]

Timbre selection in each Part can be performed in the Timbre Select mode. Timbre selection can also be done by receiving MIDI Program Change messages from an external controller unit.
See "Timbre Selection" on page 18.

### [MIDI Channel Setting for each Part]

MIDI Channel setting for each Part can be performed with the MIDI Channel parameter in Part Setting.
See "MIDI Channel" (Part Setting) on page 16.

### [Volume Balance of Parts]

The volume of each Part can be set with the Output Level parameter in Part Setting.
See "Output Level" (Part Setting) on page 23.

### [Adjusting the Volume Balance of the Timbres used within a Part]

If you wish to adjust the volumes of Timbres used in a Part, edit the TVA Levels of the Tones assigned to each Timbre.
See "Level" (Tone Edit) on page 65.

### [Adjusting the Volume Balance of each Tone used in the Rhythm Part]

The volume of each Tone of the Rhythm Part can be adjusted separately.
Use the Output Level parameter in Rhythm Edit.
See "Output Level" (Part Setting) on page 23.

### [Sending each Part separately through a Multi Output]

- **Part 1 to Part 8**

The Output Assign can be set for each Timbre with the Output Assign parameter in the Timbre Edit mode.
See "Output Assign" (Timbre Edit) on page 69.

* If the Reverb Type in Patch Edit is set to other than OFF, Multi Outputs 5 and 6 do not work.

- **Rhythm Part**

The Output Assign can be set for each Key Number in the Rhythm Part with the Output Assign parameter in Rhythm Edit.
See "Output Assign" (Rhythm Edit) on page 79.

### [Pan Editing for each Part]

- **Part 1 to Part 8**

When using the Mix Output Sockets, the Pan setting can be edited for each Timbre with the Pan parameter in the Timbre Edit mode.
See "Pan" (Timbre Edit) on page 69.

* If the Output Assign in Part Setting is set to other than MIX (when using the Multi Output Sockets), the Pan setting has no effect.

- **Rhythm Part**

The Pan setting can be edited for each Tone with the Pan parameter in Rhythm Edit.

See "Pan" (Rhythm Edit) on page 79.

* If the Output Assign in Rhythm Edit is set to other than MIX (when using the Multi Output Sockets), the Pan setting has no effect.

## [Using more than one D-110 to increase the maximum number of voices played at the same time]

The D-110's Overflow Assign function makes it possible to use two or more D-110's as a sound module. For example, using two D-110's will increase the maximum number of voices to twice as much. The Overflow Assign function sends Key messages which exceed the maximum number of voices of the first D-110.

See "Overflow Assign Switch" on page 82.

## [Sound Data Communication with the D-10 or D-20]

Sound data of the D-110 is compatible with the D-10 and D-20. The sound data (Timbres and Tones) programmed in the D-110 can be used for the D-10 or D-20, and the sound data programmed in the D-10 or D-20 can be used for the D-110. These data transfer actions are performed via memory cards or Exclusive messages.

- **Using a memory card**

A memory card which contains sound (Timbre and Tone) data can be used for any of the D-110, D-10 or D-20. However, the M-128D cannot be used for the D-10 or D-20.

See "Data Transfer" on page 84.

- **Using Exclusive messages**

See "Data Transfer" on page 86.

## [Editing with the Programmer PG-10]

Patchs, Timbres and Tones in the D-110 can be edited using the programmer PG-10. Read the PG-10's owner's manual.

# Roland Exclusive Messages

## 1. Data Format for Exclusive Messages

Roland's MIDI implementation uses the following data format for all exclusive messages (type IV):

| Byte | Description |
|---|---|
| F0H | Exclusive status |
| 41H | Manufactures ID (Roland) |
| DEV | Device ID |
| MDL | Model ID |
| CMD | Command ID |
| [BODY] | Maindata |
| F7H | End of exclusive |

### # MIDI status : F0H, F7H

An exclusive message must be flanked by a pair of status codes, starting with a Manufactures-ID immediately after F0H (MIDI version1.0).

### # Manufactures-ID : 41H

The Manufactures-ID identifies the manufacturer of a MIDI instrument that triggeres an exclusive message. Value 41H represents Roland's Manufactures-ID.

### # Device-ID : DEV

The Device-ID contains a unique value that identifies the individual device in the multiple implementation of MIDI instruments. It is usually set to 00H - 0FH, a value smaller by one than that of a basic channel, but value 00H - 1FH may be used for a device with multiple basic channels.

### # Model-ID : MDL

The Model-ID contains a value that uniquely identifies one model from another. Different models, however, may share an identical Model-ID if they handle similar data.

The Model-ID format may contain 00H in one or more places to provide an extended data field. The following are examples of valid Model-IDs, each representing a unique model:

01H
02H
03H
00H, 01H
00H, 02H
00H, 00H, 01H

### # Command-ID : CMD

The Command-ID indicates the function of an exclusive message. The Command-ID format may contain 00H in one or more places to provide an extended data field. The following are examples of valid Command-IDs, each representing a unique function:

01H
02H
03H
00H, 01H
00H, 02H
00H, 00H, 01H

### # Main data : BODY

This field contains a message to be exchanged across an interface. The exact data size and contents will vary with the Model-ID and Command-ID.

## 2. Address-mapped Data Transfer

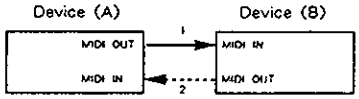
Address mapping is a technique for transferring messages conforming to the data format given in Section 1. It assigns a series of memory-resident records--waveform and tone data, switch status, and parameters, for example--to specific locations in a machine-dependent address space, thereby allowing access to data residing at the address a message specifies.

Address-mapped data transfer is therefore independent of models and data categories. This technique allows use of two different transfer procedures : one-way transfer and handshake transfer.

### # One-way transfer procedure (See Section3 for details.)

This procedure is suited for the transfer of a small amount of data. It sends out an exclusive message completely independent of a receiving device status.

**Connection Diagram**

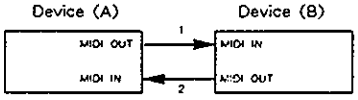



Connectionat point2 is essential for "Request data" procedures. (See Section3.)

### # Handshake-transfer procedure (See Section4 for details.)

This procedure initiates a predetermined transfer sequence (handshaking) across the interface before data transfer takes place. Handshaking ensures that reliability and transfer speed are high enough to handle a large amount of data.

**Connection Diagram**




Connectionat points1 and 2 is essential.

### Notes on the above two procedures

* There are separate Command-IDs for different transfer procedures.
* DevicesA and B cannot exchange data unless they use the same transfer procedure, share identical Device-ID and Model ID, and are ready for communication.

## 3. One-way Transfer Procedure

This procedure sends out data all the way until it stops when the messages are so short that answerbacks need not be checked.
For long messages, however, the receiving device must acquire each message in time with the transfer sequence, which inserts intervals of at least 20milliseconds in between.

Types of Messages

| Message | Command ID |
|---|---|
| Request data 1 | RQ1 (11H) |
| Data set 1 | DT1 (12H) |

### # Request data # 1 : RQ1 (11H)

This message is sent out when there is a need to acquire data from a device at the other end of the interface. It contains data for the address and size that specify designation and length, respectively, of data required.
On receiving an RQ1 message, the remote device checks its memory for the data address and size that satisfy the request.

If it finds them and is ready for communication, the device will transmit a "Data set 1 (DT1)" message, which contains the requested data. Otherwise, the device will send out nothing.

| Byte | Description |
|---|---|
| F0H | Exclusive status |
| 41H | Manufactures ID (Roland) |
| DEV | Device ID |
| MDL | Model ID |
| 11H | Command ID |
| aaH | Address MSB |
| ⋮ | ⋮ |
| | LSB |
| ssH | Size MSB |
| ⋮ | ⋮ |
| | LSB |
| sum | Check sum |
| F7H | End of exclusive |

*The size of the requested data does not indicate the number of bytes that will make up a DT1 message, but represents the address fields where the requested data resides.
*Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
*The same number of bytes comprises address and size data, which, however, vary with the Model-ID.
*The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

### # Data set 1 : DT1 (12H)

This message corresponds to the actual data transfer process. Because every byte in the data is assigned a unique address, a DT1 message can convey the starting address of one or more data as well as a series of data formatted in an address - dependent order.

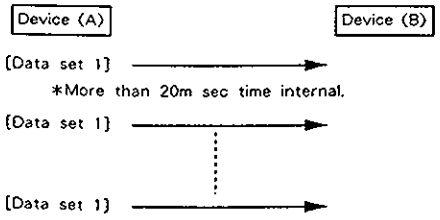
The MIDI standards inhibit non-real time messages from interrupting an exclusive one. This fact is inconvenient for the devices that support a "soft-through" mechanism. To maintain compatibility with such devices, Roland has limited the DT1 to 256 bytes so that an excessively long message is sent out in separate segments.

| Byte | Description |
|---|---|
| F0H | Exclusive |
| 41H | Manufactures ID (Roland) |
| DEV | Device ID |
| MDL | Model ID |
| 12H | Command ID |
| aaH | Address MSB |
| ⋮ | ⋮ |
| | LSB |
| ddH | Data |
| ⋮ | ⋮ |
| sum | Check sum |
| F7H | End of exclusive |

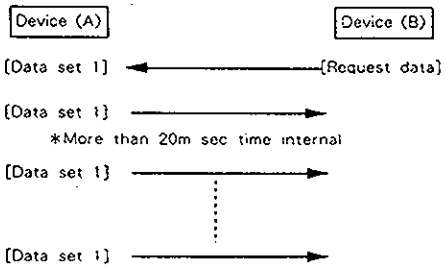
*A DT1 message is capable of providing only the valid data among those specified by an RQ1 message.
*Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
*The number of bytes comprising address data varies from one Model-ID to another.
*The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

### # Example of Message Transactions

●Device A sending data to Device B
Transfer of a DT1 message is all that takes place.




●Device B requesting data from Device A
Device B sends an RQ1 message to Device A. Checking the message, Device A sends a DT1 message back to Device B.




## 4. Handshake- Transfer Procedure

Handshaking is an interactive process where two devices exchange error checking signals before a message transaction takes place, thereby increasing data reliability. Unlike one-way transfer that inserts a pause between message transactions, handshake transfer allows much speedier transactions because data transfer starts once the receiving device returns a ready signal.

When it comes to handling large amounts of data--sampler waveforms and synthesizer tones over the entire range, for example--across a MIDI interface, handshaking transfer is more efficient than one-way transfer.

Types of Messages

| Message | Command ID |
|---|---|
| Want to send data | WSD (40H) |
| Request data | RQD (41H) |
| Data set | DAT (42H) |
| Acknowledge | ACK (43H) |
| End of data | EOD (45H) |
| Communication error | ERR (4EH) |
| Rejection | RJC (4FH) |

### # Want to send data : WSD (40H)

This message is sent out when data must be sent to a device at the other end of the interface. It contains data for the address and size that specify designation and length, respectively, of the data to be sent.

On receiving a WSD message, the remote device checks its memory for the specified data address and size which will satisfy the request. If it finds them and is ready for communication, the device will return an "Acknowledge (ACK)" message.
Otherwise, it will return a "Rejection (RJC)" message.

| Byte | Description |
|---|---|
| F0H | Exclusive status |
| 41H | Manufactures ID (Roland) |
| DEV | Device ID |
| MDL | Model ID |
| 40H | Command ID |
| aaH | Address MSB |
| ⋮ | ⋮ |
| | LSB |
| ssH | Size MSB |
| ⋮ | ⋮ |
| | LSB |
| sum | Check sum |
| F7H | End of exclusive |

*The size of the data to be sent does not indicate the number of bytes that make up a "Data set (DAT)" message, but represents the address fields where the data should reside.
*Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
*The same number of bytes comprises address and size data, which, however, vary with the Model-ID.
*The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

## # Request data : RQD (41H)

This message is sent out when there is a need to acquire data from a device at the other end of the interface. It contains data for the address and size that specify designation and length, respectively, of data required.

On receiving an RQD message, the remote device checks its memory for the data address and size which satisfy the request. If it finds them and is ready for communication, the device will transmit a "Data set (DAT)" message, which contains the requested data. Otherwise, it will return a "Rejection (RJC)" message.

| Byte | Description |
|---|---|
| F0H | Exclusive status |
| 41H | Manufactures ID (Roland) |
| DEV | Device ID |
| MDL | Model ID |
| 41H | Command ID |
| aaH<br>⋮ | Address MSB<br>⋮<br>LSB |
| ssH<br>⋮ | Size MSB<br>⋮<br>LSB |
| sum | Check sum |
| F7H | End of exclusive |

*The size of the requested data does not indicate the number of bytes, that make up a "Data set (DAT)" message, but represents the address fields where the requested data resides.
*Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
*The same number of bytes comprises address and size data, which, however, vary with the Model-ID.
*The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

## # Data set : DAT (42H)

This message corresponds to the actual data transfer process. Because every byte in the data is assigned a unique address, the message can convey the starting address of one or more data as well as a series of data formatted in an address-dependent order.

Although the MIDI standards inhibit non-real time messages from interrupting an exclusive one, some devices support a "soft-through" mechanism for such interrupts. To maintaincompatibility with such devices, Roland has limited the DAT to 256bytes so that an excessively long message is sent out in separate segments.

| Byte | Description |
|---|---|
| F0H | Exclusive status |
| 41H | Manufactures ID (Roland) |
| DEV | Device ID |
| MDL | Model ID |
| 42H | Command ID |
| aaH<br>⋮ | Address MSB<br>⋮<br>LSB |
| ddH<br>⋮ | Data<br>⋮ |
| sum | Check sum |
| F7H | End of exclusive |

*A DAT message is capable of providing only the valid data among those specified by an RQD or WSD message.
*Some models are subject to limitations in data format used for a single transaction. Requestee data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
*The number of bytes comprising address data varies from one model ID to another.
*The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

## # Acknowledge : ACK (43H)

This message is sent out when no error was detected on reception of a WSD, DAT, "End of data (EOD)", or some other message and a requested setup or action is complete. Unless it receives an ACK message, the device at the other end will not proceed to the next operation.

| Byte | Description |
|---|---|
| F0H | Exclusive status |
| 41H | Manufactures ID (Roland) |
| DEV | Device ID |
| MDL | Model ID |
| 43H | Command ID |
| F7H | End of exclusive |

## # End of data : EOD (45H)

This message is sent out to inform a remote device of the end of a message. Communication, however, will not come to an end unless the remote device returns an ACK message even though an EOD message was transmitted.

| Byte | Description |
|---|---|
| F0H | Exclusive status |
| 41H | Manufactures ID (Roland) |
| DEV | Device ID |
| MDL | Model ID |
| 45H | Command ID |
| F7H | End of exclusive |

## # Communications error : ERR (4EH)

This message warns the remote device of a communications fault encountered during message transmission due, for example, to a checksum error. An ERR message may be replaced with a "Rejection (RJC)" one, which terminates the current message transaction in midstream.

When it receives an ERR message, the sending device may either attempt to send out the last message a second time or terminate communication by sending out an RJC message.

| Byte | Description |
|---|---|
| F0H | Exclusive status |
| 41H | Manufactures ID (Roland) |
| DEV | Device ID |
| MDL | Model ID |
| 4EH | Command ID |
| F7H | End of exclusive |

## # Rejection : RJC (4FH)

This message is sent out when there is a need to terminate communication by overriding the current message. An RJC message will be triggered when :

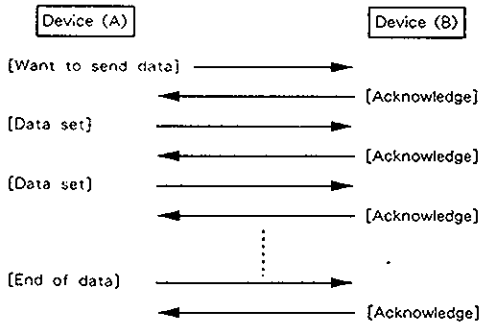
- a WSD or RQD message has specified an illegal data address or size.
- the device is not ready for communication.
- an illegal number of addresses or data has been detected.
- data transfer has been terminated by an operator.
- a communications error has occurred.

An ERR message may be sent out by a device on either side of the interface. Communication must be terminated immediately when either side triggers an ERR message.

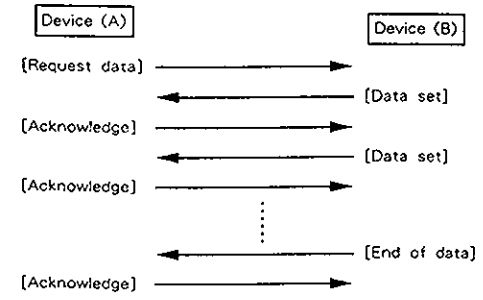
| Byte | Description |
|---|---|
| F0H | Exclusive status |
| 41H | Manufactures ID (Roland) |
| DEV | Device ID |
| MDL | Model ID |
| 4FH | Command ID |
| F7H | End of exclusive |

## # Example of Message Transactions

●Data transfer from device (A) to device (B).

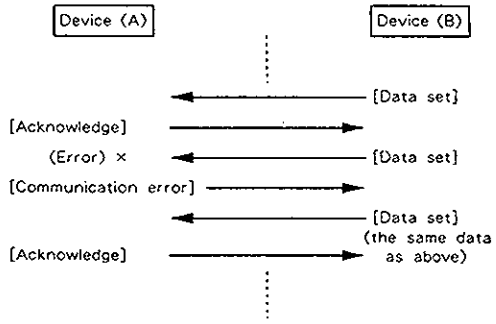



●Device (A) requests and receives data from device (B).

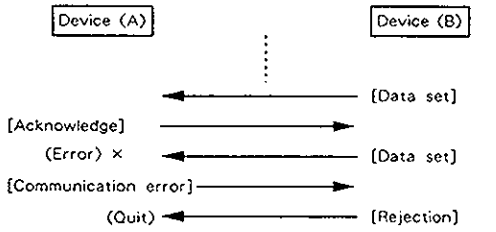



●Error occurs while device (A) is receiving data from device (B).

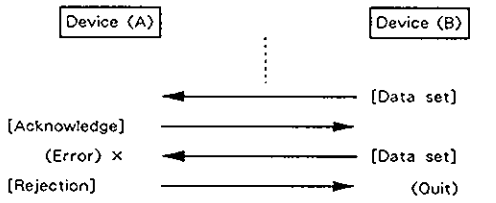
1) Data transfer from device (A) to device (B).




2) Device (B) rejects the data re-transmitted, and quits data transfer.




3) Device (A) immediately quits data transfer.



MODEL D-110

# MIDI Implementation

Date : Mar. 1. 1988

Version : 1.00

## 1. TRANSMITTED DATA

### ■ Bypassed Messages

In Overflow assgin mode, retransmits the following MIDI IN messages from MIDI OUT.

- All channel voice messages except Note on.
- Note on message(s) to which D-110 cannot assign voice(s) because the number of received Note on messages exceeds D-110's simultaneusly assignable voices.

### ■ Exclusive

Status
------
F0H : System exclusive
F7H : EOX( End Of Exclusive )

When in Patch Select or Timbre Select mode, a Patch (a set pf parameters costituting a timbre) can be transmitted.
Individual parameter can be sent while editing.
Exclusive message can be used for bulk dumping.
For details, see Sections 4 and 5, and Roland Exclusive Messages.

## 2. RECOGNIZED RECEIVE DATA (Parts 1-8)

### ■ Note event

Note off

| Status | Second | Third |
|---|---|---|
| 8nH | kkH | vvH |
| 9nH | kkH | 00H |

kk = note number 00H - 7FH ( 0 - 127 )
vv = velocity ignored
n = MIDI Channel 0H - FH ( 1 - 16 )

A tone whose envelope mode is "NO SUS" ignores Note off message.

Note on

| Status | Second | Third |
|---|---|---|
| 9nH | kkH | vvH |

kk = note number 00H - 7FH ( 0 - 127 )
vv = Velocity 01H - 7FH ( 1 - 127 )
n = MIDI Channel 0H - FH ( 1 - 16 )

Note numbers outside of the range 12-108 are transposed to the nearest octave inside the range.
(When key shift feature of D-110 is engaged, a note is first key shifted; if it still remains or becomes outside of the range, it is transposed by the octave.)

### ■ Control change

Modulation Depth

| Status | Second | Third |
|---|---|---|
| BnH | 01H | vvH |

vv = Modulation depth 00H - 7FH ( 0 - 127 )
n = MIDI Channel 0H - FH ( 1 - 16 )

Data Entry

| Status | Second | Third |
|---|---|---|
| BnH | 06H | vvH |

vv = Value of a parameter specified by RPC.
(See description in RPC NSB.)
n = MIDI Channel 0H - FH ( 1 - 16 )

Main Volume

| Status | Second | Third |
|---|---|---|
| BnH | 07H | vvH |

vv = Volume Value 00H - 7FH ( 0 - 127 )

n = MIDI Channel 0H - FH ( 1 - 16 )

Controls the volume of a Part accessible through the received MIDI channel. The maximum volume is determined by OUTPUT LEVEL set on the D-110 panel and Expression message.

Panpot

| Status | Second | Third |
|---|---|---|
| BnH | 0AH | vvH |

vv = Panpot Value 00H - 7FH ( 0 - 127 )
n = MIDI Channel 0H - FH ( 1 - 16 )

Orientation of sound is as follows.

0 = LEFT, 63 = CENTER, 127 = RIGHT

Expression

| Status | Second | Third |
|---|---|---|
| BnH | 0BH | vvH |

vv = Expression 00H - 7FH ( 0 - 127 )
n = MIDI Channel 0H - FH ( 1 - 16 )

Controls the volume of a Part accessible through the received MIDI channel. The maximum volume is determined by OUTPUT LEVEL set on the D-110 panel and Expression message.

Hold-1

| Status | Second | Third |
|---|---|---|
| BnH | 40H | vvH |

vv = 00H - 3FH : Off
vv = 40H - 7FH : On
n = MIDI Channel 0H - FH ( 1 - 16 )

RPC LSB

| Status | Second | Third |
|---|---|---|
| BnH | 64H | vvH |

vv = The lower byte of a parameter number controlled by RPC.
(Refer to RPC NSB.)
n = MIDI Channel 0H - FH ( 1 - 16 )

RPC MSB

| Status | Second | Third |
|---|---|---|
| BnH | 65H | vvH |

vv = The upper byte of a parameter number controlled by RPC.
n = MIDI Channel 0H - FH ( 1 - 16 )

Using MIDI RPC, D-110 parameters can be controlled by Control change message. RPC MSB and LSB specify the parameter to be controlled, while Data entry sets the parameter value.
Effective RPC to D-110 is Bender range.

| RPC MSB | RPC LSB | Data Entry | Description |
|---|---|---|---|
| 00H | 00H | vvH | Bender Range<br>vv= 0 - 24<br>Unit in semitone, 2 octaves maximum |

Reset All Controllers

| Status | Second | Third |
|---|---|---|
| BnH | 79H | 00H |

Sets each of the following contols as follows.

| Controller | setting |
|---|---|
| Modulation Depth | OFF ( 0 ) |
| Main Volume | MAX ( 127 ) |
| Expression | MAX ( 127 ) |
| Hold1 | OFF ( 0 ) |
| Pitch Bender Change | CENTER |

### ■ Program change

Patch / Timbre Change

| Status | Second |
|---|---|
| CnH | ppH |

pp = Patch Number 0H - 7FH ( 0 - 127 )
n = MIDI Channel 0H - FH ( 1 - 16 )

Program change information on the control channel changes patches.
If the card to accommodate program numbers 40H-7FH is not available, D-110 selects an internal patch.

| pp | I/C | BANK | NUMBER |
|---|---|---|---|
| 00H ( 00) | I | 1 | 1 |
| : | : | : | : |
| 3FH ( 63) | I | 8 | 8 |
| 40H ( 64) | C | 1 | 1 |
| : | : | : | : |
| 7FH (127) | C | 8 | 8 |

Program change information on a channel other than control channel is used to change timbres.
Switching of timbre between internal and card cannot be done through MIDI.

| pp | A/B | BANK | NUMBER |
|---|---|---|---|
| 00H ( 00) | A | 1 | 1 |
| : | : | : | : |
| 3FH ( 63) | A | 8 | 8 |
| 40H ( 64) | B | 1 | 1 |
| : | : | : | : |
| 7FH (127) | B | 8 | 8 |

### ■ Pitch Bender change

Pitch Bender

| Status | Second | Third |
|---|---|---|
| EnH | vvH | vvH |

vv vv = Pitch Bender change Value
n = MIDI Channel 0H - FH ( 1 - 16 )

■ Mode message

All notes off

| Status | Second | Third |
|---|---|---|
| BnH | 7BH | 00H |

n = MIDI Channel 0H - FH ( 1 - 16 )

Turns off all notes that have been turned on by MIDI Note on.

OMNI OFF

| Status | Second | Third |
|---|---|---|
| BnH | 7CH | 00H |

n = MIDI Channel 0H - FH ( 1 - 16 )

Recognized as only All notes off.
D-110 remains in mode 3 (Omni off, Poly).

OMNI ON

| Status | Second | Third |
|---|---|---|
| BnH | 7DH | 00H |

n = MIDI Channel 0H - FH ( 1 - 16 )

Recognized as only All notes off.
D-110 remains in mode 3 (Omni off, Poly).

MONO

| Status | Second | Third |
|---|---|---|
| BnH | 7EH | mmH |

mm = MONO channel range ignored
n = MIDI Channel 0H - FH ( 1 - 16 )

Recognized as only All notes off.
D-110 remains in mode 3 (Omni off, Poly).

POLY

| Status | Second | Third |
|---|---|---|
| BnH | 7FH | 00H |

n = MIDI Channel 0H - FH ( 1 - 16 )

Recognized as only All notes off.
D-110 remains in mode 3 (Omni off, Poly).

■ Exclusive

| Status | |
|---|---|
| F0H | : System Exclusive |
| F7H | : EOX (End of Exclusive) |

Using exclusive message, a set of parameters for a patch (timbre) or individual parameters in a patch, timbre or tone can be transferred to D-110.
Exclusive message can also be used for bulk dump/load of internal memory. Refer to Roland Exclusive Messages and Sections 4 and 5.

■ Active Sensing

| Status | |
|---|---|
| FEH | : Active Sensing |

Having received this message, D-110 expects to receive information of any status or data every 300ms (max). If D-110 fails to sense message, it assumes that MIDI bus is disconnected for some reason. Then D-110 turns off all notes which have been turned on by MIDI and returns to normal operation (will not check interval of messages).

## 3. RECOGNIZED RECEIVE DATA (Rhythm part)

Messages on MIDI channels not assigned to rhythm part are ignored.

■ Note event

Note off

| Status | Second | Third |
|---|---|---|
| 8nH | kkH | vvH |
| 9nH | kkH | 00H |

kk = note number 18H - 6CH ( 24 - 108 )
vv = velocity ignored
n = MIDI Channel 0H - FH ( 1 - 16 )

A tone whose envelope mode is NO SUS ignores this message.

Note on

| Status | Second | Third |
|---|---|---|
| 9nH | kkH | vvH |

kk = note number 18H - 6CH ( 24 - 108 )
vv = Velocity 01H - 7FH ( 1 - 127 )
n = MIDI Channel 0H - FH ( 1 - 16 )

Note numbers outside the range 24-108 are ignored.

■ Control change

Modulation Depth

| Status | Second | Third |
|---|---|---|
| BnH | 01H | vvH |

vv = Modulation depth 00H - 7FH ( 0 - 127 )
n = MIDI Channel 0H - FH ( 1 - 16 )

Data Entry

| Status | Second | Third |
|---|---|---|
| BnH | 06H | vvH |

vv = Value of a parameter specified by RPC.
(See description in RPC MSB.)
n = MIDI Channel 0H - FH ( 1 - 16 )

Main Volume

| Status | Second | Third |
|---|---|---|
| BnH | 07H | vvH |

vv = Volume Value 00H - 7FH ( 0 - 127 )
n = MIDI Channel 0H - FH ( 1 - 16 )

Can contol the volume of the rhythm part.
The maximum volume is determined by OUTPUT LEVEL set on the panel and Expression message.

Expression

| Status | Second | Third |
|---|---|---|
| BnH | 0BH | vvH |

vv = Expression 00H - 7FH ( 0 - 127 )
n = MIDI Channel 0H - FH ( 1 - 16 )

Can contol the volume of the rhythm part.
The maximum volume is determined by OUTPUT LEVEL set on the panel and Main volume message.

Hold-1

| Status | Second | Third |
|---|---|---|
| BnH | 40H | vvH |

vv = 00H - 3FH : Off
vv = 40H - 7FH : On
n = MIDI Channel 0H - FH ( 1 - 16 )

RPC LSB

| Status | Second | Third |
|---|---|---|
| BnH | 64H | vvH |

vv = Lower byte of a parameter number controlled by RPC.
(See description in RPC MSB.)
n = MIDI Channel 0H - FH ( 1 - 16 )

RPC MSB

| Status | Second | Third |
|---|---|---|
| BnH | 65H | vvH |

vv = Upper byte of a parameter number controlled by RPC.
n = MIDI Channel 0H - FH ( 1 - 16 )

MSB and LSB RPC together specifies parameter to be controlled while Data entry determines the value.
Effective RPC on D-110 is Bender range.

| RPC MSB | RPC LSB | Data Entry | Description |
|---|---|---|---|
| 00H | 00H | vvH | Bender Range<br>vv= 0 - 24<br>2 octaves max. in semitone steps |

Reset All Controllers

| Status | Second | Third |
|---|---|---|
| BnH | 79H | 00H |

n = MIDI Channel 0H - FH ( 1 - 16 )

Sets controllers to the value as shown below.

| Controller | setting | |
|---|---|---|
| Modulation Depth | OFF | ( 0 ) |
| Main Volume | MAX | ( 127 ) |
| Expression | MAX | ( 127 ) |
| Hold1 | OFF | ( 0 ) |
| Pitch Bender Change | CENTER | |

■ Pitch Bender change

Pitch Bender

| Status | Second | Third |
|---|---|---|
| BnH | vvH | vvH |

vv vv = Pitch Bender change Value
n = MIDI Channel 0H - FH ( 1 - 16 )

■ Exclusive

| Status | |
|---|---|
| F0H | : System Exclusive |
| F7H | : EOX (End of Exclusive) |

Using exclusive message, a set of parameters for a individual parameters in a rhythm part can be transferred to D-110.
Exclusive message can also be used for bulk dump/load of internal memory. Refer to Roland Exclusive Messages and Sections 4 and 5.

## 4. EXCLUSIVE COMMUNICATION

Parameters for patches, timbres or tones can be transferred to/from D-110 through Exclusive message.
Model-ID# of D-110 is 16H.
In a system where more than one MIDI channel is assigned to D-110, Unit # may be set to the D-110 instead of Device-ID# of a basic channel. The advantage of Unit # is that a specific part is made accessible independent of MIDI channel of that part.
Whether to use MIDI channel or Unit # is depend on parameter adress.
D-110 recongnizes MIDI channels 1 thru 16 and Unit # 17 thru 32 as Device-ID #. Note that the actual Device-ID # is the number 1 less MIDI channel number or Unit #.

### ■ One Way Communication

Request Data 1 RQ1 11H

| Byte | Description | |
|---|---|---|
| F0H | Exclusive status | |
| 41H | Manufactures ID (Roland) | |
| DEV | Device ID | |
| 16H | Model ID | |
| 11H | Command ID | |
| aaH | Address MSB | * 4-1 |
| aaH | Address | |
| aaH | Address LSB | |
| ssH | Size MSB | |
| ssH | Size | |
| ssH | Size LSB | |
| sum | Check sum | |
| F7H | End of exclusive | |

Data set 1 DT1 12H

| Byte | Description | |
|---|---|---|
| F0H | Exclusive status | |
| 41H | Manufactures ID (Roland) | |
| DEV | Device ID | |
| 16H | Model ID | |
| 12H | Command ID | |
| aaH | Address MSB | * 4-1 |
| aaH | Address | |
| aaH | Address LSB | |
| ddH | Data | * 4-2 |
| : | : | |
| sum | Check sum | |
| F7H | End of exclusive | |

Communication Sequence

A. Starting at transmitting unit

Upon occuring each of the following events, D-110 sends parameters using one way communication.
(Device-ID# is Unit# less 1)

- * One way bulk dump is executed in data transfer mode. (Transfers a set of parameters selected.)
- * Enter button is pressed in patch select mode. (Transfers parameters in the patch.)
- * Enter button is pressed in timbre select mode. (Transfers a parameter set in the timbre.)
- * Enter button is pressed while editting. (Transfers a parameter being editted.)

The following is an example of one way communication between two D-110's.

| Receiver(D-110) | | Transmitter(D-110) |
|---|---|---|
| | <--------[DT1] | |
| If the address matches the parameter base address, stores the data into that location. | | Transmits this message when one of the above operations is taken place. |
| ( | <--------[DT1] | ) |
| | | Will repeat sending Data set until all requested data are received by the receiver. |

B. Starting at receiver

D-110 never request data of the other party.
The following sequence applies to the other party that wants to get some parameters from D-110.

| Receiver | | Transmitter(D-110) |
|---|---|---|
| | [RQ1]---------> | |
| When a programmer or sequencer needs D-110 resident parameter. | | When the received Data request contains 1) address that matches a parameter base address and 2) address size is 1 or more, D-110 sends the data in that area. |
| | <--------[DT1] | |
| If the address matches the parameter base address, stores the data into that location. | | |
| ( | <--------[DT1] | ) |
| ( | | Will repeat sending Data set ) |
| ( | | until all requested data are ) |
| ( | | received by the receiver. ) |

### ■ Handshaking Communications

Want to send data WSD 40H

| Byte | Description | |
|---|---|---|
| F0H | Exclusive status | |
| 41H | Manufactures ID (Roland) | |
| DEV | Device ID | |
| 16H | Model ID | |
| 40H | Command ID | |
| aaH | Address MSB | * 4-1 |
| aaH | Address | |
| aaH | Address LSB | |
| ssH | Size MSB | |
| ssH | Size | |
| ssH | Size LSB | |
| sum | Check sum | |
| F7H | End of exclusive | |

Request data RQD 41H

| Byte | Description | |
|---|---|---|
| F0H | Exclusive status | |
| 41H | Manufactures ID (Roland) | |
| DEV | Device ID | |
| 16H | Model ID | |
| 41H | Command ID | |
| aaH | Address MSB | * 4-1 |
| aaH | Address | |
| aaH | Address LSB | |
| ssH | Size MSB | |
| ssH | Size | |
| ssH | Size LSB | |
| sum | Check sum | |
| F7H | End of exclusive | |

Data set DAT 42H

| Byte | Description | |
|---|---|---|
| F0H | Exclusive status | |
| 41H | Manufactures ID (Roland) | |
| DEV | Device ID | |
| 16H | Model ID | |
| 42H | Command ID | |
| aaH | Address MSB | * 4-1 |
| aaH | Address | |
| aaH | Address LSB | |
| ddH | Data | * 4-2 |
| : | : | |
| sum | Check sum | |
| F7H | End of exclusive | |

Acknowledge ACK 43H

| Byte | Description |
|---|---|
| F0H | Exclusive status |
| 41H | Manufactures ID (Roland) |
| DEV | Device ID |
| 16H | Model ID |
| 43H | Command ID |
| F7H | End of exclusive |

End of data EOD 45H

| Byte | Description |
|---|---|
| F0H | Exclusive status |
| 41H | Manufactures ID (Roland) |
| DEV | Device ID |
| 16H | Model ID |
| 45H | Command ID |
| F7H | End of exclusive |

Communication error ERR 4EH

| Byte | Description |
|---|---|
| F0H | Exclusive status |
| 41H | Manufactures ID (Roland) |
| DEV | Device ID |
| 16H | Model ID |
| 4EH | Command ID |
| F7H | End of exclusive |

Rejection RJC 4FH

| Byte | Description |
|---|---|
| F0H | Exclusive status |
| 41H | Manufactures ID (Roland) |
| DEV | Device ID |
| 16H | Model ID |
| 4FH | Command ID |
| F7H | End of exclusive |

Communication Sequence

A. Starting at transmitter

The following an example of handshaking cummunication between two D-110's.

| Receiver(D-110) | | Transmitter(D-110) |
|---|---|---|
| | <--------[WSD] | |
| | | Executing handshaking type bulk dump in the data transfer mode causes D-110 to send this message and enter into the following handshaking communication. |
| ( | {RJC}--------> | ) |
| (Will send Rejection when receiving | | Stops communication upon ) |
| (the request while it is reproducing | | receiving this message. ) |
| (any sound. | | ) |
| | [ACK]--------> | |
| If not reproducing any sound, sends this message and waits transmission of data. | | Upon receiving this message, sends the next data. |

```
                          <--------[DAT]
   If the address matches the
parameter base address, stores
the data into that location; then
sends Acknowledge.
                          [ACK]-------->

                          <--------[DAT]
                          [ACK]-------->

(                         [ERR]-------->                          )
(Should failure in data reception                When receiving this message,)
(occur(e.g. disagreement of checksum),           sends the previous data      )
(sends this message.                             again.                       )
(                         <---------[DAT]                        )

                               :
                               :

                          <--------[EOD]
Upon receipt of this message,          Sends this message at the end of
sends acknowledge and ceases           the data.
current handshaking communication.

                          [ACK]-------->
                                       Upon receiving this message in
                                       reply to End of data, ends
                                       current communication.
```

B. Starting at receiver

D-110 will never require any data of the other party. The following sequence can apply to the outside world where a unit wants to get D-110 resident parameters.

```
Receiver                                 Transmitter (D-110)
--------                                 -------------------

                          [RQD]--------->

Outside unit such as a computer
can obtain D-110 parameters by
following the steps below, starting
with transmission of Data request.

(                         <---------[RJC]                        )
(Ends current communication upon         Will send this message when  )
(receipt of this message.                Data request comes while it  )
(                                        is reproducing sound.        )

                          <---------[DAT]
                                       When the Data request comes
                                       during no-sound period and
                                       contains address listed in the
                                       Parameter base address table
                                       followed by 1 or more address
                                       size, D-110 will send the data
                                       stored in that address area
                                       and subsequent.

If the address matches the
parameter base address, stores
the data into that location; then
sends Acknowledge
                          [ACK]--------->

                                       Sends the next data in reply
                                       to Acknowledge.

                          <---------[DAT]
                          [ACK]-------->

(                         [ERR]-------->                          )
(Should failure in data reception                When receiving this message,)
(occur(e.g. disagreement of checksum),           sends the previous data      )
(sends this message.                             again.                       )
(                         <---------[DAT]                        )

                               :
                               :

                          <---------[EOD]

Sends Aknowledge in response to          Sends this data when completing
Data end and terminates handshaking      required data transfer.
communication.

                          [ACK]--------->

                                       When this message comes as an
                                       answer to the Data end,
                                       terminates communication.
```

*4-1 Address and Address size must cover the memory location where data exist.

*4-2 When comming data are for partial reserve of the system parameter, D-110 will make these reserves effective only after receiving all the data.

## 5. PARAMETER ADDRESS MAP

Addresses are represented in 7-bit hexadecimal.

| Address | MSB | | LSB |
|---|---|---|---|
| Binary | 0aaa aaaa | 0bbb bbbb | 0ccc cccc |
| 7-bit Hexadicimal | AA | BB | CC |

The actual address of a parameteris a sum of the start address of each block and one or more offset address.

| Parameter marked by | Actual address |
|---|---|
| *5-1 | Start address plus two offset addresses (in tables *5-1 and *5-1-1) |
| *5-2 | Start address plus one offset address (in table *5-2) |
| *5-3 | Start address plus two offset addresses (in tables *5-1 and *5-1-2) |
| *5-4 | Start address plus one offset address (in table *5-4) |
| *5-5 | Start address plus two offset addresses (in tables *5-5 and *5-5-1) |
| *5-6 - *5-8 | Start address plus one offset address (in table *5-6 - *5-8) |

■ Parameter Base Address

Temporary area ( Accessed through each basic channel )

| Start address | Description | |
|---|---|---|
| 02 00 00 | Tone Temporary Area (synth part) | *5-1 |

Whole part ( Accessible on UNIT# )

| Start address | Description | |
|---|---|---|
| 03 00 00 | Timbre Temporary Area ( part 1 ) | *5-2 |
| 03 00 10 | Timbre Temporary Area ( part 2 ) | |
| : | : | |
| 03 00 60 | Timbre Temporary Area ( part 7 ) | |
| 03 00 70 | Timbre Temporary Area ( part 8 ) | |
| 03 01 00 | Timbre Temporary Area ( rhythm part ) | |
| 03 01 10 | Rhythm Setup Temporary Area | *5-3 |
| 04 00 00 | Tone Temporary Area ( part 1 ) | *5-1 |
| 04 01 76 | Tone Temporary Area ( part 2 ) | |
| : | : | |
| 04 0B 44 | Tone Temporary Area ( part 7 ) | |
| 04 0D 3A | Tone Temporary Area ( part 8 ) | |
| 05 00 00 | Timbre Memory #1 | *5-4 |
| 05 00 08 | Timbre Memory #2 | |
| : | : | |
| 05 07 70 | Timbre Memory #127 | |
| 05 07 78 | Timbre Memory #128 | |
| 06 00 00 | Patch Memory #1 | *5-5 |
| 06 01 00 | Patch Memory #2 | |
| : | : | |
| 06 3E 00 | Patch Memory #63 | |
| 06 3F 00 | Patch Memory #64 | |
| 08 00 00 | Tone Memory #1 | *5-1 |
| 08 02 00 | Tone Memory #2 | |
| : | : | |
| 08 7C 00 | Tone Memory #63 | |
| 08 7E 00 | Tone Memory #64 | |
| 10 00 00 | System Area | *5-6 |
| 20 00 00 | Display | *5-7 |
| 40 00 00 | Write Request | *5-8 |

Notes :

*5-1 Tone temporary area / Tone memory

| Offset address | Description | |
|---|---|---|
| 00 00 00 | Common parameter | *5-1-1 |
| 00 00 0E | Partial parameter (for Partial# 1) | *5-1-2 |
| 00 00 48 | Partial parameter (for Partial# 2) | |
| 00 01 02 | Partial parameter (for Partial# 3) | |
| 00 01 3C | Partial parameter (for Partial# 4) | |

*5-1-1 Common parameter

| Offset address | Description | | |
|---|---|---|---|
| 00 | 0aaa aaaa | TONE NAME 1 | 32 - 127 (ASCII) |
| : | : | : | |
| 09 | 0aaa aaaa | TONE NAME 10 | |
| 0A | 0000 aaaa | Structure of Partial# 1 & 2 | 0 - 12 (1 - 131) |
| 0B | 0000 aaaa | Structure of Partial# 3 & 4 | 0 - 12 (1 - 131) |
| 0C | 0000 aaaa | PARTIAL MUTE | 0 - 15 (0000 - 1111) |
| 0D | 0000 000a | ENV MODE | 0 - 1 (Normal,No sustain) |
| Total size | | 00 00 0E | |

*5-1-2 Partial parameter

| Offset address | Description | | |
|---|---|---|---|
| 00 00 | 0aaa aaaa | WG PITCH COARSE | 0 - 96 (C1,C#1, - C9) |
| 00 01 | 0aaa aaaa | WG PITCH FINE | 0 - 100 (-50 - +50) |
| 00 02 | 0000 aaaa | WG PITCH KEYFOLLOW | 0 - 16 (-1,-1/2,-1/4,0, 1/8,1/4,3/8,1/2, 5/8,3/4,7/8,1, 5/4,3/2,2,s1,s2) |
| 00 03 | 0000 000a | WG PITCH BENDER SW | 0 - 1 (OFF, ON) |
| 00 04 | 0000 000a | WG WAVEFORM/PCM BANK | 0 - 3 (SQU/1, SAW/1, SQU/2, SAW/2) |
| 00 05 | 0aaa aaaa | WG PCM WAVE # | 0 - 127 (1 - 128) |
| 00 06 | 0aaa aaaa | WG PULSE WIDTH | 0 - 100 |
| 00 07 | 0000 aaaa | WG PW VELO SENS | 0 - 14 (-7 - +7) |
| 00 08 | 0000 aaaa | P-ENV DEPTH | 0 - 10 |
| 00 09 | 0aaa aaaa | P-ENV VELO SENS | 0 - 100 |
| 00 0A | 0000 0aaa | P-ENV TIME KEYF | 0 - 4 |
| 00 0B | 0aaa aaaa | P-ENV TIME 1 | 0 - 100 |
| 00 0C | 0aaa aaaa | P-ENV TIME 2 | 0 - 100 |
| 00 0D | 0aaa aaaa | P-ENV TIME 3 | 0 - 100 |
| 00 0E | 0aaa aaaa | P-ENV TIME 4 | 0 - 100 |
| 00 0F | 0aaa aaaa | P-ENV LEVEL 0 | 0 - 100 (-50 - +50) |
| 00 10 | 0aaa aaaa | P-ENV LEVEL 1 | 0 - 100 (-50 - +50) |
| 00 11 | 0aaa aaaa | P-ENV LEVEL 2 | 0 - 100 (-50 - +50) |
| 00 12 | 0xxx xxxx | P-ENV SUSTAIN LEVEL | 50 ( always 0 ) |
| 00 13 | 0aaa aaaa | END LEVEL | 0 - 100 (-50 - +50) |

| | | | |
|---|---|---|---|
| 00 14 | 0aaa aaaa | P-LFO RATE | 0 - 100 |
| 00 15 | 0aaa aaaa | P-LFO DEPTH | 0 - 100 |
| 00 16 | 0aaa aaaa | P-LFO MOD SENS | 0 - 100 |
| 00 17 | 0aaa aaaa | TVF CUTOFF FREQ | 0 - 100 |
| 00 18 | 000a aaaa | TVF RESONANCE | 0 - 30 |
| 00 19 | 0000 aaaa | TVF KEYFOLLOW | 0 - 14<br>(-1,-1/2,-1/4,0,<br>1/8,1/4,3/8,1/2,<br>5/8,3/4,7/8,1,<br>5/4,3/2,2) |
| 00 1A | 0aaa aaaa | TVF BIAS POINT/DIR | 0 - 127<br>(<1A - <7C >1A - >7C) |
| 00 1B | 0000 aaaa | TVF BIAS LEVEL | 0 - 14<br>(-7 - +7) |
| 00 1C | 0aaa aaaa | TVF ENV DEPTH | 0 - 100 |
| 00 1D | 0aaa aaaa | TVF ENV VELO SENS | 0 - 100 |
| 00 1E | 0000 0aaa | TVF ENV DEPTH KEYF | 0 - 4 |
| 00 1F | 0000 0aaa | TVF ENV TIME KEYF | 0 - 4 |
| 00 20 | 0aaa aaaa | TVF ENV TIME 1 | 0 - 100 |
| 00 21 | 0aaa aaaa | TVF ENV TIME 2 | 0 - 100 |
| 00 22 | 0aaa aaaa | TVF ENV TIME 3 | 0 - 100 |
| 00 23 | 0aaa aaaa | TVF ENV TIME 4 | 0 - 100 |
| 00 24 | 0aaa aaaa | TVF ENV TIME 5 | 0 - 100 |
| 00 25 | 0aaa aaaa | TVF ENV LEVEL 1 | 0 - 100 |
| 00 26 | 0aaa aaaa | TVF ENV LEVEL 2 | 0 - 100 |
| 00 27 | 0aaa aaaa | TVF ENV LEVEL 3 | 0 - 100 |
| 00 28 | 0aaa aaaa | TVF ENV SUSTAIN LEVEL | 0 - 100 |
| 00 29 | 0aaa aaaa | TVA LEVEL | 0 - 100 |
| 00 2A | 0aaa aaaa | TVA VELO SENS | 0 - 100<br>(-50 - +50) |
| 00 2B | 0aaa aaaa | TVA BIAS POINT 1 | 0 - 127<br>(<1A - <7C >1A - >7C) |
| 00 2C | 0000 aaaa | TVA BIAS LEVEL 1 | 0 - 12<br>(-12 - 0) |
| 00 2D | 0aaa aaaa | TVA BIAS POINT 2 | 0 - 127<br>(<1A - <7C >1A - >7C) |
| 00 2E | 0000 aaaa | TVA BIAS LEVEL 2 | 0 - 12<br>(-12 - 0) |
| 00 2F | 0000 0aaa | TVA ENV TIME KEYF | 0 - 4 |
| 00 30 | 0000 0aaa | TVA ENV TIME V_FOLLOW | 0 - 4 |
| 00 31 | 0aaa aaaa | TVA ENV TIME 1 | 0 - 100 |
| 00 32 | 0aaa aaaa | TVA ENV TIME 2 | 0 - 100 |
| 00 33 | 0aaa aaaa | TVA ENV TIME 3 | 0 - 100 |
| 00 34 | 0aaa aaaa | TVA ENV TIME 4 | 0 - 100 |
| 00 35 | 0aaa aaaa | TVA ENV TIME 5 | 0 - 100 |
| 00 36 | 0aaa aaaa | TVA ENV LEVEL 1 | 0 - 100 |
| 00 37 | 0aaa aaaa | TVA ENV LEVEL 2 | 0 - 100 |
| 00 38 | 0aaa aaaa | TVA ENV LEVEL 3 | 0 - 100 |
| 00 39 | 0aaa aaaa | TVA ENV SUSTAIN LEVEL | 0 - 100 |
| Total size | | 00 00 3A | |

Example of RQ1 and DT1 application --- 1

Assuming that D-110 sets Unit # to 17, obtain Part 2 tone data from the temporary area by sending the following messages.

F0 41 10 16 11 04 01 76 00 01 78 0E F7

#5-2 Timbre temporary area

| Offset address | | Description | |
|---|---|---|---|
| 00 00 | 0000 0aaa | TONE GROUP | 0 - 3<br>(a, b, i/c, r) |
| 00 01 | 00aa aaaa | TONE NUMBER | 0 - 63<br>(1 - 64) |
| 00 02 | 00aa aaaa | KEY SHIFT | 0 - 48<br>(-24 - +24) |
| 00 03 | 0aaa aaaa | FINE TUNE | 0 - 100<br>(-50 - +50) |
| 00 04 | 000a aaaa | BENDER RANGE | 0 - 24 |
| 00 05 | 0000 00aa | ASSIGN MODE | 0 - 3<br>(POLY 1,POLY 2,<br>POLY 3,POLY 4) |
| 00 06 | 0000 0aaa | OUTPUT ASSIGN | 0 - 7<br>(MIX,MIX,MULTI 1<br>2,3,4,5,6) |
| 00 07 | 0xxx xxxx | dummy | |
| 00 08 | 0aaa aaaa | OUTPUT LEVEL | 0 - 100 |
| 00 09 | 0000 aaaa | PANPOT | 0 - 14<br>(L - R) |
| 00 0A | 0aaa aaaa | KEY RANGE LOWER | 0 - 127 |
| 00 0B | 0aaa aaaa | KEY RANGE UPPER | 0 - 127 |
| 00 0C<br>:<br>00 0F | 0xxx xxxx<br>:<br>0xxx xxxx | dummy<br>:<br>dummy | |
| Total size | | 00 00 10 | |

#5-3 Rhythm part setup area

| Offset address | Description | |
|---|---|---|
| 00 00 00 | Rhythm Setup (for Key# 24) | #5-3-1 |
| 00 00 04 | Rhythm Setup (for Key# 25) | |
| 00 00 08 | Rhythm Setup (for Key# 26) | |
| 00 00 0C | Rhythm Setup (for Key# 27) | |
| 00 00 10 | Rhythm Setup (for Key# 28) | |
| :<br>:<br>:<br>00 02 4C | :<br>:<br>:<br>Rhythm Setup (for Key# 107) | |
| 00 02 50 | Rhythm Setup (for Key# 108) | |

#5-3-1 Rhythm setup (for each Key #)

| Offset address | | Description | |
|---|---|---|---|
| 00 00 | 0aaa aaaa | TONE | 0 - 127<br>(i01-i64,r01-r64) |
| 00 01 | 0aaa aaaa | OUTPUT LEVEL | 0 - 100 |
| 00 02 | 0000 aaaa | PANPOT | 0 - 14<br>(L - R) |
| 00 03 | 0000 0aaa | OUTPUT ASSIGN | 0 - 7<br>(MIX,MIX,MULTI 1<br>2,3,4,5,6) |
| Total size | | 00 00 04 | |

#5-4 Timbre memory

| Offset address | | Description | |
|---|---|---|---|
| 00 00 | 0000 0aaa | TONE GROUP | 0 - 3<br>(a, b, i/c, r) |
| 00 01 | 00aa aaaa | TONE NUMBER | 0 - 63 |
| 00 02 | 00aa aaaa | KEY SHIFT | 0 - 48<br>(-24 - +24) |
| 00 03 | 0aaa aaaa | FINE TUNE | 0 - 100<br>(-50 - +50) |
| 00 04 | 000a aaaa | BENDER RANGE | 0 - 24 |
| 00 05 | 0000 00aa | ASSIGN MODE | 0 - 3<br>(POLY 1,POLY 2,<br>POLY 3,POLY 4) |
| 00 06 | 0000 0aaa | OUTPUT ASSIGN | 0 - 7<br>(MIX,MIX,MULTI 1<br>2,3,4,5,6) |
| 00 07 | 0xxx xxxx | dummy | |
| Total size | | 00 00 08 | |

#5-5 Patch memory

The total number of Partial reserves for 9 parts must be 32 or less.
All Partial reserves must be sent as a package of 9 parts.

| Offset address | | Description | |
|---|---|---|---|
| 00<br>:<br>09 | 0aaa aaaa<br>:<br>0aaa aaaa | PATCH NAME 1<br>:<br>PATCH NAME 1 | 32 - 127<br>(ASCII) |
| 00 0A | 0000 00aa | REVERB MODE | 0 - 8<br>(Room1/2, Hall1/2,<br>Plate, Tap delay<br>1/2/3, OFF) |
| 00 0B | 0000 0aaa | REVERB TIME | 0 - 7<br>(1 - 8) |
| 00 0C | 0000 0aaa | REVERB LEVEL | 0 - 7 |
| 00 0D | 00aa aaaa | PARTIAL RESERVE (Part 1) | 0 - 32 |
| 00 0E | 00aa aaaa | PARTIAL RESERVE (Part 2) | 0 - 32 |
| 00 0F | 00aa aaaa | PARTIAL RESERVE (Part 3) | 0 - 32 |
| 00 10 | 00aa aaaa | PARTIAL RESERVE (Part 4) | 0 - 32 |
| 00 11 | 00aa aaaa | PARTIAL RESERVE (Part 5) | 0 - 32 |
| 00 12 | 00aa aaaa | PARTIAL RESERVE (Part 6) | 0 - 32 |
| 00 13 | 00aa aaaa | PARTIAL RESERVE (Part 7) | 0 - 32 |
| 00 14 | 00aa aaaa | PARTIAL RESERVE (Part 8) | 0 - 32 |
| 00 15 | 00aa aaaa | PARTIAL RESERVE (Part R) | 0 - 32 |
| 00 16 | 000a aaaa | MIDI CHANNEL(Part 1) | 0 - 16<br>(1 - 16,OFF) |
| 00 17 | 000a aaaa | MIDI CHANNEL(Part 2) | 0 - 16 |
| 00 18 | 000a aaaa | MIDI CHANNEL(Part 3) | 0 - 16 |
| 00 19 | 000a aaaa | MIDI CHANNEL(Part 4) | 0 - 16 |
| 00 1A | 000a aaaa | MIDI CHANNEL(Part 5) | 0 - 16 |
| 00 1B | 000a aaaa | MIDI CHANNEL(Part 6) | 0 - 16 |
| 00 1C | 000a aaaa | MIDI CHANNEL(Part 7) | 0 - 16 |
| 00 1D | 000a aaaa | MIDI CHANNEL(Part 8) | 0 - 16 |
| 00 1E | 000a aaaa | MIDI CHANNEL(Part R) | 0 - 16 |
| 00 1F | | PATCH PARAMETERS(Part 1) | #5-5-1 |
| 00 2B | | PATCH PARAMETERS(Part 2) | |
| 00 37 | | PATCH PARAMETERS(Part 3) | |
| 00 43 | | PATCH PARAMETERS(Part 4) | |
| 00 4F | | PATCH PARAMETERS(Part 5) | |
| 00 5B | | PATCH PARAMETERS(Part 6) | |
| 00 67 | | PATCH PARAMETERS(Part 7) | |
| 00 73 | | PATCH PARAMETERS(Part 8) | |
| 00 7F | 0aaa aaaa | OUTPUT LEVEL(Rhythm Part) | 0 - 100 |
| Total size | | 00 01 00 | |

#5-5-1 Patch parameters (for each part)

| Offset address | | Description | |
|---|---|---|---|
| 00 00 | 0000 00aa | TONE GROUP | 0 - 4 |
| 00 01 | 00aa aaaa | TONE NUMBER | 0 - 63 |
| 00 02 | 00aa aaaa | KEY SHIFT | 0 - 48<br>(-24 - +24) |
| 00 03 | 0aaa aaaa | FINE TUNE | 0 - 100<br>(-50 - +50) |
| 00 04 | 000a aaaa | BENDER RANGE | 0 - 24 |
| 00 05 | 0000 00aa | ASSIGN MODE | 0 - 3 |
| 00 06 | 0aaa aaaa | OUTPUT ASSIGN | 0 - 7 |
| 00 07 | 0xxx xxxx | dummy | |
| 00 08 | 0aaa aaaa | OUTPUT LEVEL | 0 - 100 |
| 00 09 | 0000 aaaa | PANPOT | 0 - 14 (L-R) |
| 00 0A | 0aaa aaaa | KEY RANGE LOWER | 0 - 127 |
| 00 0B | 0aaa aaaa | KEY RANGE UPPER | 0 - 127 |
| Total size | | 00 00 0C | |

#5-6 System area

The total number of Partial reserves for 9 parts must be 32 or less.
All Partial reserves must be sent as a package of 9 parts.

| Offset address | | Description | |
|---|---|---|---|
| 00 00 | 0aaa aaaa | MASTER TUNE | 0 - 127<br>(432.1Hz - 457.6Hz) |
| 00 01 | 0000 00aa | REVERB MODE | 0 - 8<br>(Room1/2, Hall1/2,<br>Plate, Tap delay<br>1/2/3, OFF) |
| 00 02 | 0000 0aaa | REVERB TIME | 0 - 7<br>(1 - 8) |
| 00 03 | 0000 0aaa | REVERB LEVEL | 0 - 7 |
| 00 04 | 00aa aaaa | PARTIAL RESERVE (Part 1) | 0 - 32 |
| 00 05 | 00aa aaaa | PARTIAL RESERVE (Part 2) | 0 - 32 |
| 00 06 | 00aa aaaa | PARTIAL RESERVE (Part 3) | 0 - 32 |
| 00 07 | 00aa aaaa | PARTIAL RESERVE (Part 4) | 0 - 32 |
| 00 08 | 00aa aaaa | PARTIAL RESERVE (Part 5) | 0 - 32 |
| 00 09 | 00aa aaaa | PARTIAL RESERVE (Part 6) | 0 - 32 |
| 00 0A | 00aa aaaa | PARTIAL RESERVE (Part 7) | 0 - 32 |
| 00 0B | 00aa aaaa | PARTIAL RESERVE (Part 8) | 0 - 32 |
| 00 0C | 00aa aaaa | PARTIAL RESERVE (Part R) | 0 - 32 |

| | | | |
|---|---|---|---|
| 00 0D | 000a aaaa | MIDI CHANNEL(Part 1) | 0 - 16 (1 - 16,OFF) |
| 00 0E | 000a aaaa | MIDI CHANNEL(Part 2) | 0 - 16 (1 - 16,OFF) |
| 00 0F | 000a aaaa | MIDI CHANNEL(Part 3) | 0 - 16 (1 - 16,OFF) |
| 00 10 | 000a aaaa | MIDI CHANNEL(Part 4) | 0 - 16 (1 - 16,OFF) |
| 00 11 | 000a aaaa | MIDI CHANNEL(Part 5) | 0 - 16 (1 - 16,OFF) |
| 00 12 | 000a aaaa | MIDI CHANNEL(Part 6) | 0 - 16 (1 - 16,OFF) |
| 00 13 | 000a aaaa | MIDI CHANNEL(Part 7) | 0 - 16 (1 - 16,OFF) |
| 00 14 | 000a aaaa | MIDI CHANNEL(Part 8) | 0 - 16 (1 - 16,OFF) |
| 00 15 | 000a aaaa | MIDI CHANNEL(Part R) | 0 - 16 (1 - 16,OFF) |
| 00 16 | 0xxx xxxx | dummy | |
| 00 17 : 00 20 | 0aaa aaaa : 0aaa aaaa | PATCH NAME 1 : PATCH NAME 10 | 32 - 127 (ASCII) |
| Total size | | 00 | |

Example of RQ1 and DT1 application --- 2

Assuming that D-110 sets Unit # to 17, set Partial reserve of each part as follows by sending the byte string listed below.
Part 1 ..... 8 Parts 3 thru 8 ..... 0
Part 2 ..... 10 Rhythm part ..... 8

F0 41 10 16 12 10 00 04 08 0A 00 00 00 00 00 00 08 66 F7

#5-7 Display

D-110 deciphers incoming data and sends them to the LCD as a string of ASCII code characters. (In play mode)
Fiddling D-110 panel switches or sending Display reset address data to D-110 returns the display to the normal reading.
No display data in this area can be brought outside world by the use of RQ1 and RQD.

| Offset address | Description | | |
|---|---|---|---|
| 00 00 : 00 1F | 0aaa aaaa : 0aaa aaaa | DISPLAYED LETTER : DISPLAYED LETTER | 32 - 127 (ASCII) |
| 01 00 | 0xxx xxxx | DISPLAY RESET | |
| Total size | | 00 00 21 | |

#5-8 Write request

This message simulates write switch on D-110, that is, D-110 writes data of each part in the temorary area into internal memory or memory card.( Memory must be specified by two bytes addresses.) D-110 will inform back of the writing result.
No data in the temorary area can be brought outside world throuxh MIDI exclusive message such as RQ1 and RQD.

| Offset address | Description | | |
|---|---|---|---|
| 00 00 | 00aa aaaa | Tone Write (part 1) | 0 - 63 (01 - 64) |
| 00 01 | 0000 000a | | 0, 1 (Internal,Card) |
| 00 02 : 00 0E | 00aa aaaa : 00aa aaaa | Tone Write (part 2) : Tone Write (part 8) | |
| 00 03 : 00 0F | 0000 000a : 0000 000a | | |
| 01 00 | 0aaa aaaa | Timbre Write (part 1) | 0 - 127 (A11 - B88) |
| 01 01 | 0000 000a | | 0, 1 (Internal,Card) |
| 01 02 : 01 0E | 0aaa aaaa : 0aaa aaaa | Timbre Write (part 2) : Timbre Write (part 8) | |
| 01 03 : 01 0F | 0000 000a : 0000 000a | | |
| 02 00 | 00aa aaaa | Patch Write | 0 - 63 (11 - 88) |
| 02 01 | 0000 000a | | 0, 1 (Internal,Card) |
| 10 00 | 0000 00aa | Result | 0 - 3<br>0 = Function Completed<br>1 = Card Not Ready<br>2 = Write Protected<br>3 = Incorrect Mode |

Example of RQ1 and DT1 application --- 3

Assuming that D-110 sets Unit # to 17, direct D-110 to write data of Part 3 in the temorary area into I-B24 by sending the byte string listed below.

F0 41 10 16 12 40 01 04 4B 00 70 F7

Address Map

| Address | Block | Sub Block | Reference |
|---|---|---|---|
| 02 00 00 | Tone Temp. (Basic Ch) | Common | 5-1-1 |
| | | Partial 1 | 5-1-2 |
| | | Partial 2 | |
| | | Partial 3 | |
| | | Partial 4 | |
| 03 00 00 | Timbre Temp. (Unit#) | Part 1 | 5-2 |
| | | Part 2 | |
| | | : | |
| | | Part 8 | |
| | | Part R | |
| 03 01 10 | Rhythm Setup Temp(Unit#) | Note# 24 | 5-3 |
| | | Note# 25 | |
| | | : | |
| | | Note# 107 | |
| | | Note# 108 | |
| 04 00 00 | Tone Temp. (Unit#) | Part 1 | 5-1 |
| | | Part 2 | |
| | | : | |
| | | Part 7 | |
| | | Part 8 | |
| 05 00 00 | Timbre Memory | I-A11 (# 1) | 5-4 |
| | | I-A12 (# 2) | |
| | | : | |
| | | I-B87 (#127) | |
| | | I-B88 (#128) | |
| 06 00 00 | Patch Memory | I-A11 (# 1) | 5-5 |
| | | I-A12 (# 2) | |
| | | : | |
| | | I-B87 (#127) | |
| | | I-B88 (#128) | |
| 08 00 00 | Tone Memory | i-01 | 5-1 |
| | | i-02 | |
| | | : | |
| | | i-63 | |
| | | i-64 | |
| 10 00 00 | System A | | 5-6 |
| 20 00 00 | Display | | 5-7 |
| 40 00 00 | Write Req | | 5-8 |

MULTI TIMBRAL LINEAR SYNTHESIZER MODULE

MODEL D-110

# MIDI Implementation Chart

Date : Mar. 1. 1988

Version : 1.00

| Function... | | Transmitted | Recognized | Remarks |
|---|---|---|---|---|
| Basic | Default | 1-16 | 1-16 | memorized |
| Channel | Changed | 1-16 | 1-16 | |
| Mode | Default | × | 3 | |
| | Messages | × | × | |
| | Altered | ********* | | |
| Note Number | | × | 0-127 | |
| | True Voice | ********* | 12-108 | |
| Velocity | Note ON | × | ○ v=1-127 | |
| | Note OFF | × | × | |
| After Touch | Key's | × | × | |
| | Ch's | × | × | |
| Pitch Bender | | × | ○ | |
| Control Change | 1 | × | ○ | Modulation |
| | 2-5 | × | × | |
| | 6 | × | ** | Data Entry |
| | 7 | × | ○ | Volume |
| | 6-9 | × | × | |
| | 10 | × | ○ | Pan |
| | 11 | × | ○ | Expression |
| | 12-63 | × | × | |
| | 64 | × | ○ | Hold1 |
| | 65-99 | × | × | |
| | 100, 101 | × | ** (0) | RPC LSB, MSB |
| | 102-120 | × | × | |
| | 121 | × | ○ | Reset all Controllers |
| Prog Change | | × | ○ 0-127 | |
| | True # | ********* | 0-127 | |
| System Exclusive | | * | * | |
| System Common | Song Pos | × | × | |
| | Song Sel | × | × | |
| | Tune | × | × | |
| System Real Time | Clock | × | × | |
| | Commands | × | × | |
| Aux Message | Local ON/OFF | × | × | |
| | All Notes OFF | × | ○ (123-127) | |
| | Active Sense | × | ○ | |
| | Reset | × | × | |
| Notes | | * Can be set to ○ or × by manual operation.<br>** RPC=Registered Parameter Control Number<br>RPC #0 : Pitch Bend Sensitivity<br>The value of parameter is to be determined by entering data. | | |

Mode 1 : OMNI ON, POLY
Mode 2 : OMNI ON, MONO
Mode 3 : OMNI OFF, POLY
Mode 4 : OMNI OFF, MONO

○ : Yes
× : No

# ■ SPECIFICATIONS

**D-110 :** Multi Timbral Sound Module

**•Sound source**
LA System
Maximum Voices : 32 Voices

**•Memory**
Patches : 64
Timbres : 128
Preset Tones : 128
Programmable Tones : 64
Preset Rhythm Tones : 63

**•Memory Card**
[M-256D]
Patches : 64
Timbres : 128
Tones : 64
Rhythm Setups : One Set

[M-128D]
Patches : 32
Timbres : 128
Tones : 32
Rhythm Setups : One Set

[Front Panel]
Volume Knob
Exit Button
Patch Button
Timbre Button
Edit Button
Part Button
System Button
Write/Copy Button
Enter Button
Part Select Button x 2
Parameter/Group Button x 2
Parameter/Bank Button x 2
Value/Number Button x 2
Headphones Socket
Memory Card Slot

[Display]
2 lines, 16 letter (back–lit)

[Indicator]
MIDI Message Indicator

[Rear Panel]
Mix Output Socket x 2
Multi Output Socket x 6
MIDI Connectors (IN/OUT/THRU)

**Dimentions :** 482 (W) x 286 (D) x 44 (H) mm
19" x 11-¼" x 1-¾"

**Weight :** 3.7 kg / 8 lb 3 oz

**Consumption :** 12 W

**Accessories :**
Owner's Manual
Operation Mode/Preset Tone Table
Tone Parameter/PCM Sound Table
Guide Book for MIDI
MIDI Cable (1m) x 1
Connection Cable (LP-25) x2

[Options]
Memory Card (RAM) : M-256D, M-128D
Programmer : PG-10
Stereo Headphones : RH-100
MIDI/SYNC Cable : MSC-07/15/25/50/100

# ■INDEX


Bender Range . . . . . 43
Bender Switch . . . . . 56
Bias Level . . . . . 62, 65
Bias Point . . . . . 62, 65
Common . . . . . 53
Control Channel . . . . . 30, 81
Cutoff Frequency . . . . . 61
Data Transfer . . . . . 12, 83
Depth (TVF) . . . . . 63
ENV Depth (TVF) . . . . . 63
ENV Mode . . . . . 55
ENV Time/Level (TVA) . . . . . 66
ENV Time/Level (TVF) . . . . . 64
Exclusive Unit Number . . . . . 82
Fine Tune . . . . . 43
Handshake . . . . . 86
Key Follow (Frequency) . . . . . 62
Key Follow (Pitch) . . . . . 56
Key Follow (Pitch ENV Time) . . . . . 60
Key Follow (Time TVA) . . . . . 64
Key Follow (Time TVF) . . . . . 64
Key Range . . . . . 70
Key Shift . . . . . 43
LA Synthesis . . . . . 10, 90
Level . . . . . 23, 60, 65
LFO Depth . . . . . 61
LFO Rate . . . . . 61
Load from Card . . . . . 86
Loading . . . . . 83
Master Tuning . . . . . 23, 80
Maximum Voices . . . . . 14
Memory Card . . . . . 11, 20, 85, 109
Memory Protect . . . . . 81
MIDI Channel . . . . . 16, 17
Modulation Sensitivity . . . . . 61
Multi Output . . . . . 10, 44, 108
Multi Timbre Function . . . . . 10
One-Way . . . . . 86
Output Assign (Part Setting) . . . . . 44
Output Assign (Rhythm Setting) . . . . . 79
Output Level (Part Setting) . . . . . 23, 69
Output Level (Rhythm Setting) . . . . . 78
Overflow Assign Switch . . . . . 82
Pan . . . . . 24, 69
Pan (Rhythm Edit) . . . . . 79
Part . . . . . 10
Part Setting . . . . . 12, 68, 100, 108
Partial . . . . . 12, 94
Partial Copy . . . . . 52
Partial Mute . . . . . 54, 93
Partial Rsserve . . . . . 70
Patch . . . . . 10, 37, 105
Patch Edit . . . . . 11, 40
Patch Name . . . . . 41
Patch Select . . . . . 11
Patch Write . . . . . 28, 71
PCM Sound Generator . . . . . 45
Pitch Coarse . . . . . 55
Pitch ENV . . . . . 59
Pitch ENV Depth . . . . . 59
Pitch ENV Time/Level . . . . . 60
Pitch Fine . . . . . 55
Preset Rhythm Tones . . . . . 101
Program Change . . . . . 19, 30
Protect Switch . . . . . 71, 85
Pulse Width . . . . . 59
RAM Card . . . . . 21
RCM Wave Bank/Number . . . . . 57
Resonance . . . . . 61
Reverb . . . . . 10, 25
Reverb Level . . . . . 26, 41
Reverb Time . . . . . 26, 41
Reverb Type . . . . . 26, 41
Rhythm Part . . . . . 10, 22, 102, 108, 109
Rhythm Setup . . . . . 12, 39, 77, 100
Ring Modulator . . . . . 46, 93
ROM Card . . . . . 21
ROM Play . . . . . 88
Save to Card . . . . . 85
Saving . . . . . 83
Structure . . . . . 54, 92, 94
Synthesizer Sound Generator . . . . . 45
System Setup . . . . . 39, 80, 100
Timbre . . . . . 10, 13, 36
Timbre Edit . . . . . 11, 42
Timbre Select . . . . . 11, 18
Tone . . . . . 10, 36, 78, 106
Tone (Rhythm Edit) . . . . . 78
Tone Copy . . . . . 51
Tone Edit . . . . . 11, 45
Tone Select . . . . . 43
TVA (Time Variant Amplifier) . . . . . 48
TVF (Time Variant Filter) . . . . . 48
Velocity Sensitivity (Pitch ENV) . . . . . 59
Velocity Sensitivity (Pulse Width) . . . . . 59
Velocity Sensitivity (Time 1 TVA) . . . . . 66
Velocity Sensitivity (TVA) . . . . . 65
Velocity Sensitivity (TVF ENV) . . . . . 63
WG (Wave Generator) . . . . . 47
Writing . . . . . 71

# ■PCM Sounds

(Bank 1)

| No. | PCM Name | Remarks |
|---|---|---|
| 001 | Bass Drum-1 | Rhythm Sound |
| 002 | Bass Drum-2 | |
| 003 | Bass Drum-3 | |
| 004 | Snare Drum-1 | |
| 005 | Snare Drum-2 | |
| 006 | Snare Drum-3 | |
| 007 | Snare Drum-4 | |
| 008 | Tom Tom-1 | |
| 009 | Tom Tom-2 | |
| 010 | High-Hat | |
| 011 | High-Hat (Loop) | |
| 012 | Crash Cymbal-1 | |
| 013 | Crash Cymbal-2 (Loop) | |
| 014 | Ride Cymbal-1 | |
| 015 | Ride Cymbal-2 (Loop) | |
| 016 | Cup | |
| 017 | China Cymbal-1 | |
| 018 | China Cymbal-2 (Loop) | |
| 019 | Rim Shot | |
| 020 | Hand Clap | |
| 021 | Mute High Conga | |
| 022 | Conga | |
| 023 | Bongo | |
| 024 | Cowbell | |
| 025 | Tambourine | |
| 026 | Agogo | |
| 027 | Claves | |
| 028 | Timbale High | |
| 029 | Timbale Low | |
| 030 | Cabasa | |
| 031 | Timpani Attack | Attack Sound |
| 032 | Timpani | |
| 033 | Acoustic Piano High | |
| 034 | Acoustic Piano Low | |
| 035 | Piano Forte Thump | |
| 036 | Organ Percusson | |
| 037 | Trumpet | |
| 038 | Lips | |
| 039 | Trombone | |
| 040 | Clarinet | |
| 041 | Flute High | |
| 042 | Flute Low | |
| 043 | Steamer | |
| 044 | Indian Flute | |
| 045 | Breath | |
| 046 | Vibraphone High | |
| 047 | Vibraphone Low | |
| 048 | Marimba | |
| 049 | Xylophone High | |
| 050 | Xylophone Low | |
| 051 | Kalimba | |
| 052 | Wind Bell | |
| 053 | Chime Bar | |
| 054 | Hammer | |
| 055 | Guiro | |
| 056 | Chink | |
| 057 | Nats | |
| 058 | Fretless Bass | |
| 059 | Pull Bass | |
| 060 | Slap Bass | |
| 061 | Thump Bass | |
| 062 | Acoustic Bass | |
| 063 | Electric Bass | |
| 064 | Gut Guitar | |

| No. | PCM Name | Remarks |
|---|---|---|
| 065 | Steel Guitar | |
| 066 | Dirty Guitar | |
| 067 | Pizzicato | |
| 068 | Harp | |
| 069 | Contrabass | |
| 070 | Cello | |
| 071 | Violin-1 | |
| 072 | Violin-2 | |
| 073 | Koto | |
| 074 | Drawbars (Loop) | Sustained Sound |
| 075 | High Organ (Loop) | |
| 076 | Low Organ (Loop) | |
| 077 | Trumpet (Loop) | |
| 078 | Trombone (Loop) | |
| 079 | Sax-1 (Loop) | |
| 080 | Sax-2 (Loop) | |
| 081 | Reed (Loop) | |
| 082 | Slap Bass (Loop) | |
| 083 | Acoustic Bass (Loop) | |
| 084 | Electric Bass-1 (Loop) | |
| 085 | Electric Bass-2 (Loop) | |
| 086 | Gut Guitar (Loop) | |
| 087 | Steel Guitar (Loop) | |
| 088 | Electric Guitar (Loop) | |
| 089 | Clav (Loop) | |
| 090 | Cello (Loop) | |
| 091 | Violin (Loop) | |
| 092 | Electric Piano-1 (Loop) | |
| 093 | Electric Piano-2 (Loop) | |
| 094 | Harpsehord-1 (Loop) | |
| 095 | Harpsichord-2 (Loop) | |
| 096 | Telephone Bell (Loop) | |
| 097 | Female Voice-1 (Loop) | |
| 098 | Female Voice-2 (Loop) | |
| 099 | Male Voice-1 (Loop) | |
| 100 | Male Voice-2 (Loop) | |
| 101 | Spectrum-1 (Loop) | |
| 012 | Spectrum-2 (Loop) | |
| 103 | Spectrum-3 (Loop) | |
| 104 | Spectrum-4 (Loop) | |
| 105 | Spectrum-5 (Loop) | |
| 106 | Spectrum-6 (Loop) | |
| 107 | Spectrum-7 (Loop) | |
| 108 | Spectrum-8 (Loop) | |
| 109 | Spectrum-9 (Loop) | |
| 110 | Spectrum-10 (Loop) | |
| 111 | Noise (Loop) | |
| 112 | Shot-1 | Decay Sound |
| 113 | Shot-2 | |
| 114 | Shot-3 | |
| 115 | Shot-4 | |
| 116 | Shot-5 | |
| 117 | Shot-6 | |
| 118 | Shot-7 | |
| 119 | Shot-8 | |
| 120 | Shot-9 | |
| 121 | Shot-10 | |
| 122 | Shot-11 | |
| 123 | Shot-12 | |
| 124 | Shot-13 | |
| 125 | Shot-14 | |
| 126 | Shot-15 | |
| 127 | Shot-16 | |
| 128 | Shot-17 | |

(Bank 2)

| No. | PCM Name | Remarks |
|---|---|---|
| 001 | Bass Drum-1* | Rhythm Sound (The pitch is not affected by Master Tuning) |
| 002 | Bass Drum-2* | |
| 003 | Bass Drum-3* | |
| 004 | Snare Drum-1* | |
| 005 | Snare Drum-2* | |
| 006 | Snare Drum-3* | |
| 007 | Snare Drum-4* | |
| 008 | Tom Tom-1* | |
| 009 | Tom Tom-2* | |
| 010 | High-Hat* | |
| 011 | High-Hat* (Loop) | |
| 012 | Crash Cymbal-1* | |
| 013 | Crash Cymbal-2* Loop) | |
| 014 | Ride Cymbal-1* | |
| 015 | Ride Cymbal-2* (Loop) | |
| 016 | Cup* | |
| 017 | China Cymbal-1* | |
| 018 | China Cymbal-2* (Loop) | |
| 019 | Rim Shot* | |
| 020 | Hand Clap* | |
| 021 | Mute High Conga* | |
| 022 | Conga* | |
| 023 | Bongo* | |
| 024 | Cowbell* | |
| 025 | Tambourine* | |
| 026 | Agogo* | |
| 027 | Claves* | |
| 028 | Timbale High* | |
| 029 | Timbale Low* | |
| 030 | Cabasa* | |
| 031 | Loop-1 | Effect Sound (Repeats of the Same Sound) |
| 032 | Loop-2 | |
| 033 | Loop-3 | |
| 034 | Loop-4 | |
| 035 | Loop-5 | |
| 036 | Loop-6 | |
| 037 | Loop-7 | |
| 038 | Loop-8 | |
| 039 | Loop-9 | |
| 040 | Loop-10 | |
| 041 | Loop-11 | |
| 042 | Loop-12 | |
| 043 | Loop-13 | |
| 044 | Loop-14 | |
| 045 | Loop-15 | |
| 046 | Loop-16 | |
| 047 | Loop-17 | |
| 048 | Loop-18 | |
| 049 | Loop-19 | |
| 050 | Loop-20 | |
| 051 | Loop-21 | |
| 052 | Loop-22 | |
| 053 | Loop-23 | |
| 054 | Loop-24 | |
| 055 | Loop-25 | |
| 056 | Loop-26 | |
| 057 | Loop-27 | |
| 058 | Loop-28 | |
| 059 | Loop-29 | |
| 060 | Loop-30 | |
| 061 | Loop-31 | |
| 062 | Loop-32 | |
| 063 | Loop-33 | |
| 064 | Loop-34 | |

| No. | PCM Name | Remarks |
|---|---|---|
| 065 | Loop-35 | |
| 066 | Loop-36 | |
| 067 | Loop-37 | |
| 068 | Loop-38 | |
| 069 | Loop-39 | |
| 070 | Loop-40 | |
| 071 | Loop-41 | |
| 072 | Loop-42 | |
| 073 | Loop-43 | |
| 074 | Loop-44 | |
| 075 | Loop-45 | |
| 076 | Loop-46 | |
| 077 | Loop-47 | |
| 078 | Loop-48 | |
| 079 | Loop-49 | |
| 080 | Loop-50 | |
| 081 | Loop-51 | |
| 082 | Loop-52 | |
| 083 | Loop-53 | |
| 084 | Loop-54 | |
| 085 | Loop-55 | |
| 086 | Loop-56 | |
| 087 | Loop-57 | |
| 088 | Loop-58 | |
| 089 | Loop-59 | |
| 090 | Loop-60 | |
| 091 | Loop-61 | |
| 092 | Loop-62 | |
| 093 | Loop-63 | |
| 094 | Loop-64 | |
| 095 | Jam-1 (Loop) | Effect Sound (Repeats of Combined Sounds) |
| 096 | Jam-2 (Loop) | |
| 097 | Jam-3 (Loop) | |
| 098 | Jam-4 (Loop) | |
| 099 | Jam-5 (Loop) | |
| 100 | Jam-6 (Loop) | |
| 101 | Jam-7 (Loop) | |
| 102 | Jam-8 (Loop) | |
| 103 | Jam-9 (Loop) | |
| 104 | Jam-10 (Loop) | |
| 105 | Jam-11 (Loop) | |
| 106 | Jam-12 (Loop) | |
| 107 | Jam-13 (Loop) | |
| 108 | Jam-14 (Loop) | |
| 109 | Jam-15 (Loop) | |
| 110 | Jam-16 (Loop) | |
| 111 | Jam-17 (Loop) | |
| 112 | Jam-18 (Loop) | |
| 113 | Jam-19 (Loop) | |
| 114 | Jam-20 (Loop) | |
| 115 | Jam-21 (Loop) | |
| 116 | Jam-22 (Loop) | |
| 117 | Jam-23 (Loop) | |
| 118 | Jam-24 (Loop) | |
| 119 | Jam-25 (Loop) | |
| 120 | Jam-26 (Loop) | |
| 121 | Jam-27 (Loop) | |
| 122 | Jam-28 (Loop) | |
| 123 | Jam-29 (Loop) | |
| 124 | Jam-30 (Loop) | |
| 125 | Jam-31 (Loop) | |
| 126 | Jam-32 (Loop) | |
| 127 | Jam-33 (Loop) | |
| 128 | Jam-34 (Loop) | |

*When Sound Number is set between 112 and 128, Click noise may be caused in some parameters of TVA ENV.

Roland

# D-110 MULTI TIMBRAL SOUND MODULE

## ■Tone Parameters

〔Common Parameter〕

| Parameter Group | Parameter | Display |
|---|---|---|
| Common | Tone Name | Name |
| | Structure 1&2 | Structure 1&2 |
| | Structure 3&4 | Structure 3&4 |
| | Partial Mute | Partial Mute |
| | ENV Mode | ENV Mode |

〔Partial Parameter〕

| Parameter Group | Parameter | Display | PCM |
|---|---|---|---|
| WG | Pitch Coarse | WG Pitch Cors | ○ |
| | Pitch Fine | WG Pitch Fine | ○ |
| | Keyfollow(Pitch) | WG Pitch KF | ○ |
| | Bender Switch | WG Bender SW | ○ |
| | Waveform | WG Waveform | × |
| | PCM Wave Bank | PCM Bank | ○ |
| | PCM Wave No. | PCM | ○ |
| | Pulse Width | WG Puls Width | × |
| | Velocity Sensitivity(Pulse Width) | WG PW Velo | × |
| Pitch ENV | Pitch ENV Depth | P-ENV Depth | ○ |
| | Velocity Sensitivity(Depth) | P-ENV Velo | ○ |
| | Key Follow(Time) | P-ENV Time KF | ○ |
| | Time 1/2/3/4 | P-ENV T1(..4) | ○ |
| | Level 0/1/2 | P-ENV L0(..2) | ○ |
| | Sustain Level | P-ENV Sus L | ○ |
| | End Level | P-ENV End L | ○ |
| LFO | Rate | P-LFO Rate | ○ |
| | Depth | P-LFO Depth | ○ |
| | Modulation Senstivity | P-LFO Mod | ○ |
| TVF | Frequency | TVF Freq | × |
| | Resonance | TVF Reso | × |
| | Keyfollow(Frequency) | TVF Freq KF | × |
| | Bias Point | TVF Bias P | × |
| | Bias Level | TVF Bias Lvl | × |
| TVF ENV | ENV Depth | TVF-ENV Dept | × |
| | Velocity Sensitivity(Depth) | TVF-ENV Velo | × |
| | Keyfollow(Depth) | TVF-ENV DKF | × |
| | Keyfollow(Time) | TVF-ENV TKF | × |
| | Time 1/2/3/4/5 | TVF-ENV T1(..5) | × |
| | Level 1/2/3 | TVF-ENV L1(..3) | × |
| | Sustain Level | TVF-ENV Sus L | × |
| TVA | Level | TVA Level | ○ |
| | Velocity Sensitivity | TVA Velocity | ○ |
| | Bias Point 1/2 | TVA Bias P1(2) | ○ |
| | Bias Level 1/2 | TVA-Bias L1(2) | ○ |
| TVA ENV | Keyfollow(Time) | TVA-ENV TKF | ○ |
| | Velocity Follow(Time 1) | TVA-ENV T1VF | ○ |
| | Time 1/2/3/4/5 | TVA-ENV T1(..5) | ○ |
| | Level 1/2/3 | TVA-ENV L1(..3) | ○ |
| | Sustain Level | TVA-ENV Sus L | ○ |

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# D-110 MULTI TIMBRAL SOUND MODULE

## ■Preset Tones

Group a

| No. | Tone Name | Number of Partials |
|---|---|---|
| 01 | Acou Piano 1 | 3 |
| 02 | Acou Piano 2 | 2 |
| 03 | Acou Piano 3 | 2 |
| 04 | Honky-Tonk | 3 |
| 05 | Elec Piano 1 | 3 |
| 06 | Elec Piano 2 | 3 |
| 07 | Elec Piano 3 | 2 |
| 08 | Elec Piano 4 | 1 |
| 09 | Elec Organ 1 | 4 |
| 10 | Elec Organ 2 | 2 |
| 11 | Elec Organ 3 | 2 |
| 12 | Elec Organ 4 | 1 |
| 13 | Pipe Organ 1 | 3 |
| 14 | Pipe Organ 2 | 3 |
| 15 | Pipe Organ 3 | 2 |
| 16 | Accordion | 2 |
| 17 | Harpsi 1 | 3 |
| 18 | Harpsi 2 | 2 |
| 19 | Harpsi 3 | 1 |
| 20 | Clav 1 | 3 |
| 21 | Clav 2 | 2 |
| 22 | Clav 3 | 2 |
| 23 | Celesta 1 | 3 |
| 24 | Celesta 2 | 2 |
| 25 | Violin 1 | 3 |
| 26 | Violin 2 | 2 |
| 27 | Cello 1 | 3 |
| 28 | Cello 2 | 2 |
| 29 | Contrabass | 2 |
| 30 | Pizzicato | 3 |
| 31 | Harp 1 | 3 |
| 32 | Harp 2 | 2 |
| 33 | Strings 1 | 4 |
| 34 | Strings 2 | 3 |
| 35 | Strings 3 | 2 |
| 36 | Strings 4 | 3 |
| 37 | Brass 1 | 4 |
| 38 | Brass 2 | 3 |
| 39 | Brass 3 | 4 |
| 40 | Brass 4 | 4 |
| 41 | Trumpet 1 | 3 |
| 42 | Trumpet 2 | 2 |
| 43 | Trombone 1 | 3 |
| 44 | Trombone 2 | 2 |
| 45 | Horn | 3 |
| 46 | Fr Horn | 2 |
| 47 | Engl Horn | 2 |
| 48 | Tuba | 2 |
| 49 | Flute 1 | 4 |
| 50 | Flute 2 | 2 |
| 51 | Piccolo | 3 |
| 52 | Recorder | 2 |
| 53 | Pan Pipes | 3 |
| 54 | Bottleblow | 4 |
| 55 | Breathpipe | 4 |
| 56 | Whistle | 2 |
| 57 | Sax 1 | 2 |
| 58 | Sax 2 | 2 |
| 59 | Sax 3 | 2 |
| 60 | Clarinet 1 | 2 |
| 61 | Clarinet 2 | 3 |
| 62 | Oboe | 3 |
| 63 | Bassoon | 2 |
| 64 | Harmonica | 2 |

Group b

| No. | Tone Name | Number of Partials |
|---|---|---|
| 01 | Fantasy | 4 |
| 02 | Harmo Pan | 4 |
| 03 | Chorale | 3 |
| 04 | Glasses | 3 |
| 05 | Soundtrack | 4 |
| 06 | Atmosphere | 4 |
| 07 | Warm Bell | 4 |
| 08 | Space Horn | 4 |
| 09 | Echo Bell | 3 |
| 10 | Ice Rains | 4 |
| 11 | Oboe 2002 | 2 |
| 12 | Echo Pan | 2 |
| 13 | Bell Swing | 2 |
| 14 | Reso Synth | 2 |
| 15 | Steam Pad | 3 |
| 16 | Vibe String | 4 |
| 17 | Syn Lead 1 | 3 |
| 18 | Syn Lead 2 | 2 |
| 19 | Syn Lead 3 | 3 |
| 20 | Syn Lead 4 | 2 |
| 21 | Syn Bass 1 | 3 |
| 22 | Syn Bass 2 | 2 |
| 23 | Syn Bass 3 | 2 |
| 24 | Syn Bass 4 | 3 |
| 25 | Acou Bass 1 | 2 |
| 26 | Acou Bass 2 | 1 |
| 27 | Elec Bass 1 | 3 |
| 28 | Elec Bass 2 | 2 |
| 29 | Slap Bass 1 | 2 |
| 30 | Slap Bass 2 | 3 |
| 31 | Fretless 1 | 4 |
| 32 | Fretless 2 | 2 |
| 33 | Vibe | 2 |
| 34 | Glock | 3 |
| 35 | Marimba | 3 |
| 36 | Xylophone | 2 |
| 37 | Guitar 1 | 3 |
| 38 | Guitar 2 | 3 |
| 39 | Elec Gtr 1 | 4 |
| 40 | Elec Gtr 2 | 4 |
| 41 | Koto | 2 |
| 42 | Shamisen | 2 |
| 43 | Jamisen | 2 |
| 44 | Sho | 4 |
| 45 | Shakuhachi | 4 |
| 46 | Wadaiko Set | 4 |
| 47 | Sitar | 4 |
| 48 | Steel Drum | 4 |
| 49 | Tech Snare | 4 |
| 50 | Elec Tom | 4 |
| 51 | Revrse Cym | 2 |
| 52 | Ethno Hit | 4 |
| 53 | Timpani | 2 |
| 54 | Triangle | 2 |
| 55 | Wind Bell | 3 |
| 56 | Tube Bell | 4 |
| 57 | Orche Hit | 4 |
| 58 | Bird Tweet | 1 |
| 59 | One Note Jam | 4 |
| 60 | Telephone | 1 |
| 61 | Typewriter | 2 |
| 62 | Insect | 2 |
| 63 | Water Bells | 3 |
| 64 | Jungle Tune | 4 |

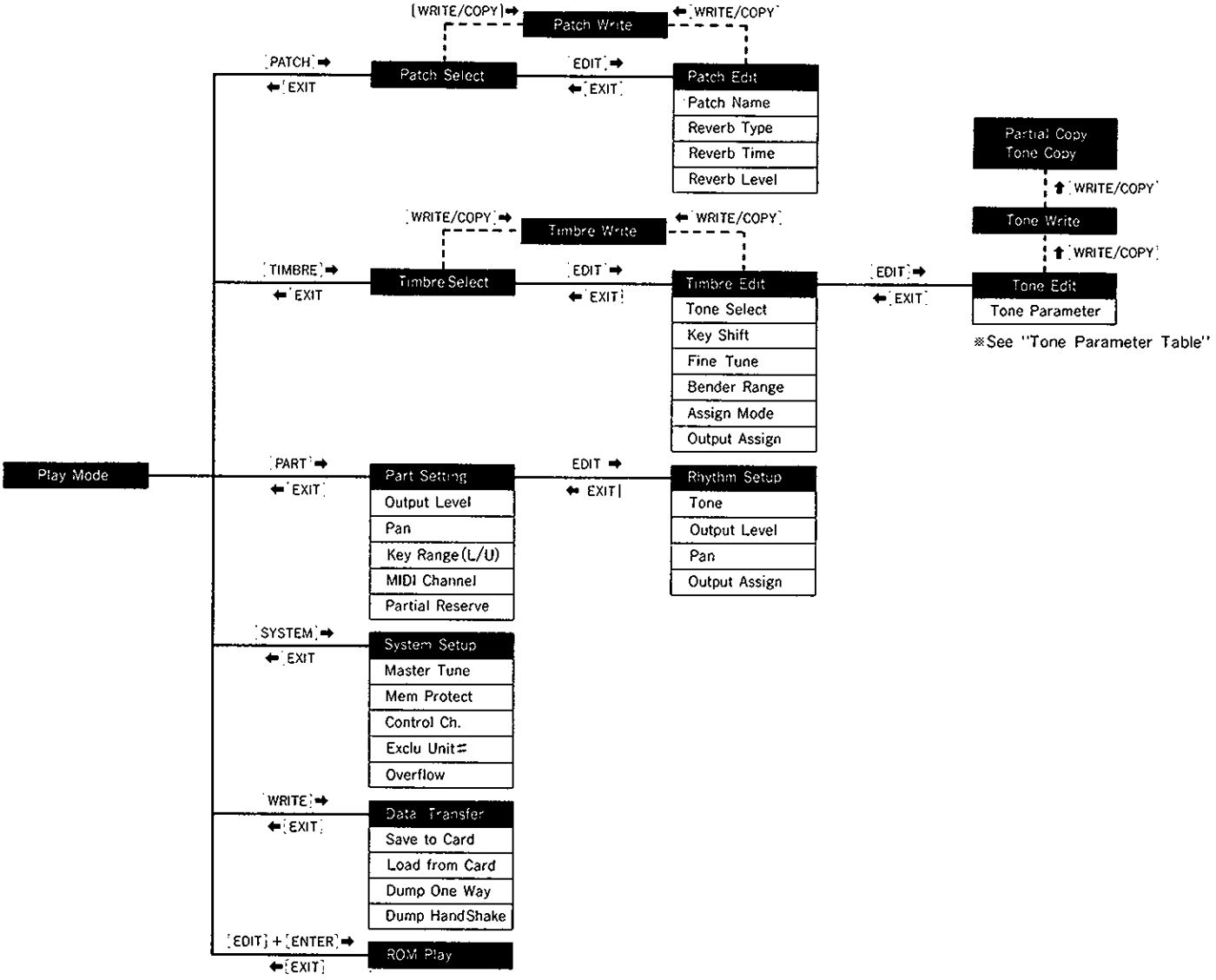
Group r

| No. | Tone Name | Number of Partials |
|---|---|---|
| r01 | Closed High Hat-1 | 1 |
| r02 | Closed High Hat-2 | 1 |
| r03 | Open High Hat-1 | 2 |
| r04 | Open High Hat-2 | 2 |
| r05 | Crash Cymbal | 2 |
| r06 | Crash Cymbal (Short) | 1 |
| r07 | Crash Cymbal (Mute) | 1 |
| r08 | Ride Cymbal | 2 |
| r09 | Ride Cymbal (Short) | 1 |
| r10 | Ride Cymbal (Mute) | 1 |
| r11 | Cup | 2 |
| r12 | Cup (Mute) | 1 |
| r13 | China Cymbal | 2 |
| r14 | Splash Cymbal | 1 |
| r15 | Bass Drum-1 | 2 |
| r16 | Bass Drum-2 | 1 |
| r17 | Bass Drum-3 | 2 |
| r18 | Bass Drum-4 | 1 |
| r19 | Snare Drum-1 | 1 |
| r20 | Snare Drum-2 | 1 |
| r21 | Snare Drum-3 | 1 |
| r22 | Snare Drum-4 | 2 |
| r23 | Snare Drum-5 | 1 |
| r24 | Snare Drum-6 | 1 |
| r25 | Rim Shot | 1 |
| r26 | Brush-1 | 2 |
| r27 | Brush-2 | 2 |
| r28 | High Tom Tom-1 | 1 |
| r29 | Middle Tom Tom-1 | 1 |
| r30 | Low Tom Tom-1 | 1 |
| r31 | High Tom Tom-2 | 1 |
| r32 | Middle Tom Tom-2 | 1 |
| r33 | Low Tom Tom-2 | 1 |
| r34 | High Tom Tom-3 | 2 |
| r35 | Middle Tom Tom-3 | 2 |
| r36 | Low Tom Tom-3 | 2 |
| r37 | High Pitch Tom Tom-1 | 1 |
| r38 | High Pitch Tom Tom-2 | 1 |
| r39 | Hand Clap | 1 |
| r40 | Tambourine | 1 |
| r41 | Cowbell | 1 |
| r42 | High Bongo | 1 |
| r43 | Low Bongo | 1 |
| r44 | High Conga (Mute) | 1 |
| r45 | High Conga | 1 |
| r46 | Low Conga | 1 |
| r47 | High Timbale | 1 |
| r48 | Low Timbale | 1 |
| r49 | High Agogo | 1 |
| r50 | Low Agogo | 1 |
| r51 | Cabasa | 1 |
| r52 | Maracas | 1 |
| r53 | Short Whistle | 2 |
| r54 | Long Whistle | 2 |
| r55 | Quijada | 3 |
| r56 | Claves | 1 |
| r57 | Castanets | 2 |
| r58 | Triangle | 2 |
| r59 | Wood Block | 1 |
| r60 | Bell | 2 |
| r61 | Native Drum-1 | 1 |
| r62 | Native Drum-2 | 1 |
| r63 | Native Drum-3 | 1 |
| OFF | | (0) |

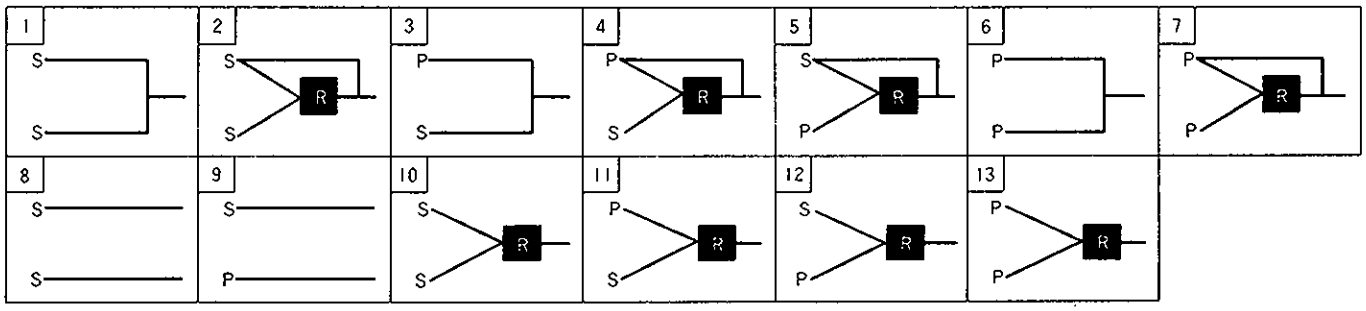
Roland

# D-110 MULTI TIMBRAL SOUND MODULE

## ■Play Mode




## ■Structure




## ■Reverb Type

| | | | |
|---|---|---|---|
| 1 | Small Room | 5 | Plate |
| 2 | Medium Room | 6 | Delay 1 |
| 3 | Medium Hall | 7 | Delay 2 |
| 4 | Large Hall | 8 | Delay 3 |

2701040000 '89-4-A3-9I

Roland

For Canada

**CLASS B** **NOTICE**

This digital apparatus does not exceed the Class B limits for radio noise emissions set out in the Radio Interference Regulations of the Canadian Department of Communications.

**CLASSE B** **AVIS**

Cet appareil numérique ne dépasse pas les limites de la classe B au niveau des émissions de bruits radioélectriques fixés dans le Réglement des signaux parasites par le ministère canadien des Communications.

D-110



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